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An Investment in Good Will and Its Results

How a Large Plant Has Been Organized to Facilitate the Handling of Thousands of Automobile Parts

By H Cole Estep

It is not wholly uncommon for honorable men who fail in business and avail themselves of the protection of the bankruptcy courts to repay their creditors in full from subsequent earnings in a new venture, although there is not the slightest legal obligation to do so. Such acts are simply a recognition of the moral responsibility for debt which rests upon individuals. But for corporations to pursue a similar course has been much more unusual, while instances where the corporate successor of a defunct manufacturing company has been willing to invest a substantial part of its resources for the fulfillment of a purely moral obligation of its predecessor are almost unknown. Such a step, however, has been taken by the Maxwell Motor Co., Detroit, which last year purchased the assets of the bankrupt United States Motor Co.

At the time of the reorganization, there were over 122,000 automobiles of various models in service on the road that had been manufactured by the United States Motor Co. The receivership left the owners of these cars without facilities for obtaining parts for replacements made necessary by wear or accidents and aside from the great inconvenience and expense involved, the second hand value of the machines was cut in two. To meet this situation the new Maxwell Motor Co. has invested nearly $2,000,000 in a large plant at Newcastle, Ind., solely for the production and storage of thousands of spare parts to fit the numerous models made by the old company.

This action furnishes striking evidence of the change in the attitude of large corporations toward the public that has taken place in the last few years and forms an example that might profitably be followed by concerns in many other lines of production. No legal obligation rested on the Maxwell Motor Co., nor, according to the precedents of the trade, was there any moral obligation.

The common practice of such concerns succeeding other bankrupt concerns has been to dispose of the repair parts business to some junk dealer or to some firm making a business of furnishing replacement parts for old automobiles. Obviously, such a firm would not have much sympathy for those who purchased the cars and there would be a strong tendency to give indifferent

FIG. 1—CENTER AISLE IN THE MAXWELL MOTOR CO.'S, NEWCASTLE, IND., FORGE SHOP

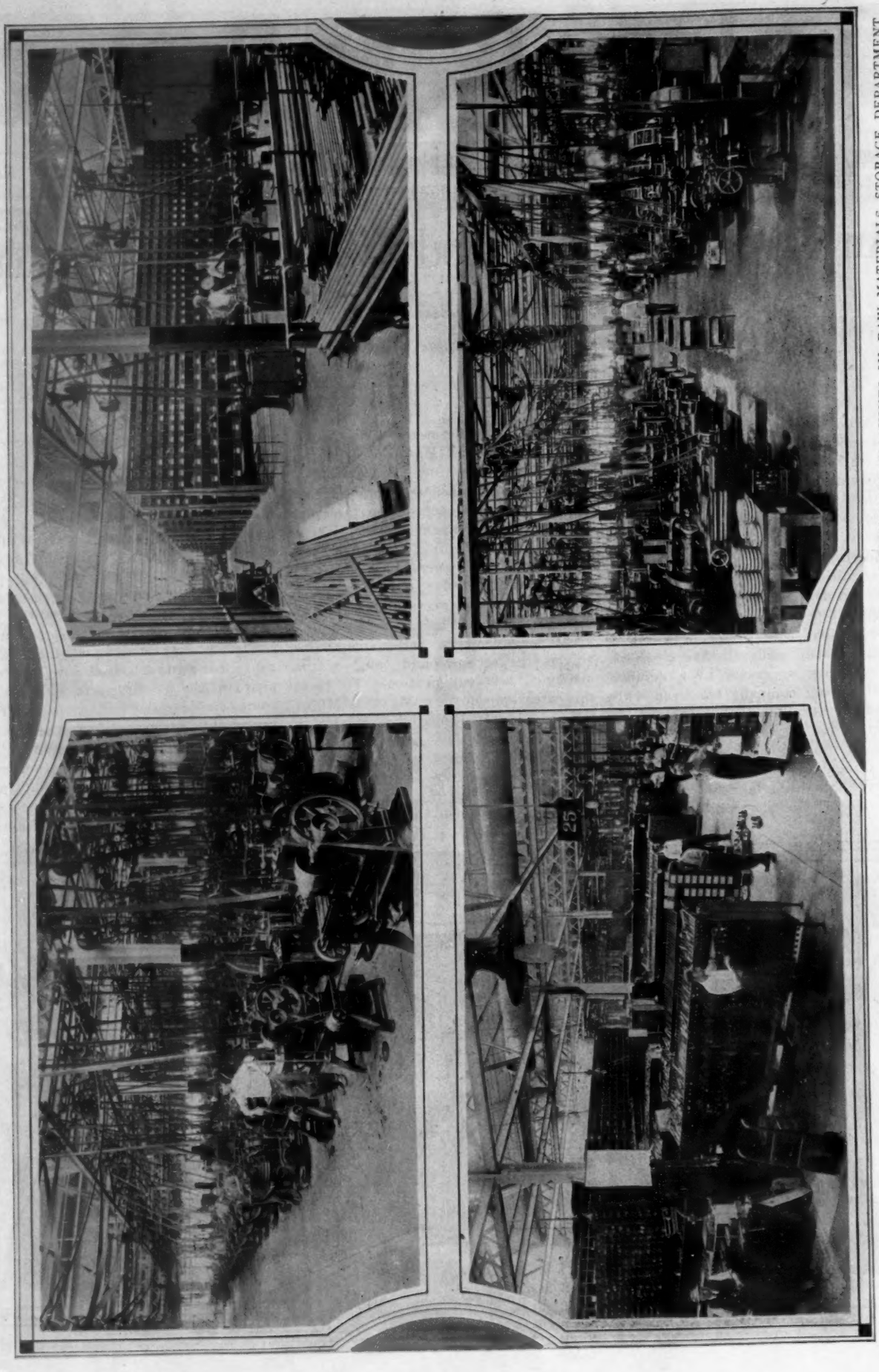


FIG. 3—CUTTING-OFF MACHINES IN RAW MATERIALS STORAGE DEPARTMENT
FIG. 5—A BATTERY OF GEAR CUTTING MACHINES

FIG. 2—AUTOMATIC TOOLS IN THE MACHINE SHOP
FIG. 4—A CORNER IN THE TOOL ROOM

service and to charge exorbitant prices. The good will value of the Maxwell policy, therefore, cannot be estimated in money, and even if the venture were not in itself profitable, it would fully be justified from the standpoint of public policy. It is an example of the enlightened business methods and advanced ideas of corporate responsibility of the twentieth century.

The United States Motor Co. was a consolidation of several other manufacturers who produced nine different makes of automobiles. These included the Maxwell, Stoddard-Dayton, Columbia, Everett, Brush, Courier, Courier-Claremont and Sampson-35 cars and the Alden-Sampson truck. The first Maxwell car was *Model L*, a two-cylinder runabout made in 1905 and the 48th model was a 40-horsepower touring car produced in 1913. The first Stoddard-Dayton, *Model A*, was a five-passenger touring car made in 1905, selling at $2,000, and the 56th model was a seven-passenger Knight limousine. The first Columbia was made in 1896 and was an electric Stanhope; it was called *Mark* 1. The last model, *Mark* 89, was a six-cylinder Columbia-Knight made in 1913. There were several variations in each Mark, for example in *Mark* 11 there were 16 models. In addition, the Columbia company produced a large number of special cars which varied from the standard product in important particulars. Leaving these out of consideration, the Maxwell Motor Co. has been obliged to provide parts for 164 different models made between 1896 and 1913. The average automobile contains at least 1,500 parts and, therefore, it is necessary to keep on hand over 246,000 different individual parts, and in many cases several hundred parts of one kind must be kept in stock to fill the demand. These figures give some conception of the magnitude of the task which the Maxwell Motor Co. has assumed. The problem, however, involved a great deal more than simply making up a large stock of parts from records already at hand.

Heavy Stocks of Parts

The United States Motor Co. had attempted to give good service to the owners of its cars by carrying heavy stocks of parts with numerous dealers in various sections of the country. During the period of financial difficulty, these stocks were allowed to become badly depleted and were no longer distributed with reference to the demand. For instance, a dealer in Los Angeles might have on hand 36 left front fenders for a 1908 *Model K* Stoddard-Dayton, but no left rear fenders or right front ones. There might be a whole roomful of fenders on hand but the man who wanted one for a 1913 model Columbia would still have to send to some other branch for his particular fender. This condition was, of course, intolerable, while on the other hand, to carry adequate stocks for all models at all of the distributing points would require millions of dollars. The drawings, tools, dies, jigs and patterns from which the parts were made were also scattered around the country in a much similar manner. In fact, when the Maxwell Motor Co. commenced to do business it was found that in many cases the stock inventories were misleading, drawings were destroyed, patterns had been broken up, valuable records were mislaid and the men who had been associated with the old organization and were familiar with its routine had wandered to the four corners of the earth.

Among the manufacturing plants inherited by the new corporation was a large one at Newcastle, Ind., where the Maxwell-Briscoe motor cars had been produced. On account of its extensive facilities and central geographical position, it was decided to convert this plant into a parts factory, and steps were taken to concentrate the entire service department of the Maxwell Motor Co., at Newcastle. Arrangements were made to ship the stocks on hand at various distributing agencies to the parts factory, where they could be properly sorted and indexed, making it possible to intelligently manufacture the new parts necessary to fill the shortages in the inventory. At the same time steps were taken to assemble the drawings, patterns, dies, jigs, tools, etc., which had been used in manufacturing the old parts, and to rearrange the Newcastle plant so it could perform its new functions economically. This task was entrusted to J. E. Burns, superintendent of service and the work commenced in March, 1913. By the close of the year everything was running smoothly.

The Newcastle plant occupies a plot of ground about 1,000 feet square and contains approximately 650,000 square feet of floor space. The main

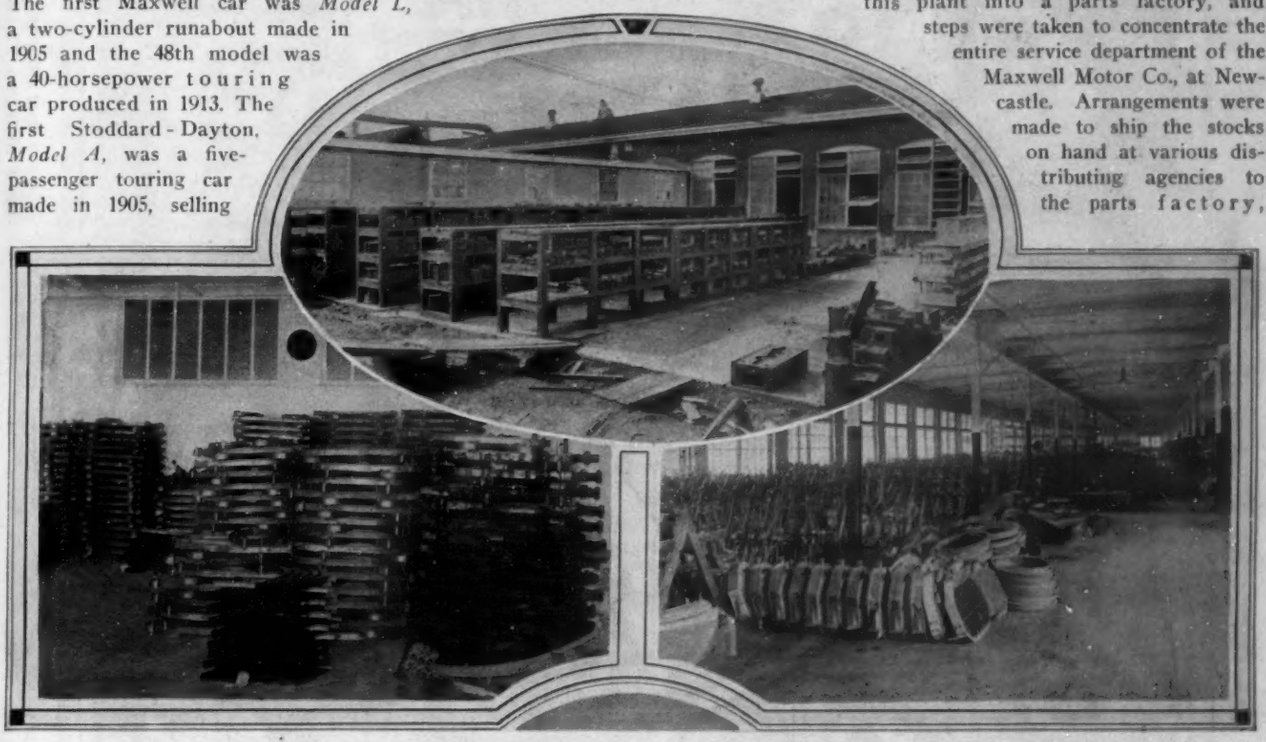


FIG. 6—DIES FOR DROP FORGINGS TO COVER OLD MODEL PARTS

FIG. 7—SPRINGS ARE PILED FLAT IN TIERS FIG. 8—AXLES AND FENDERS FOR OLD MODELS

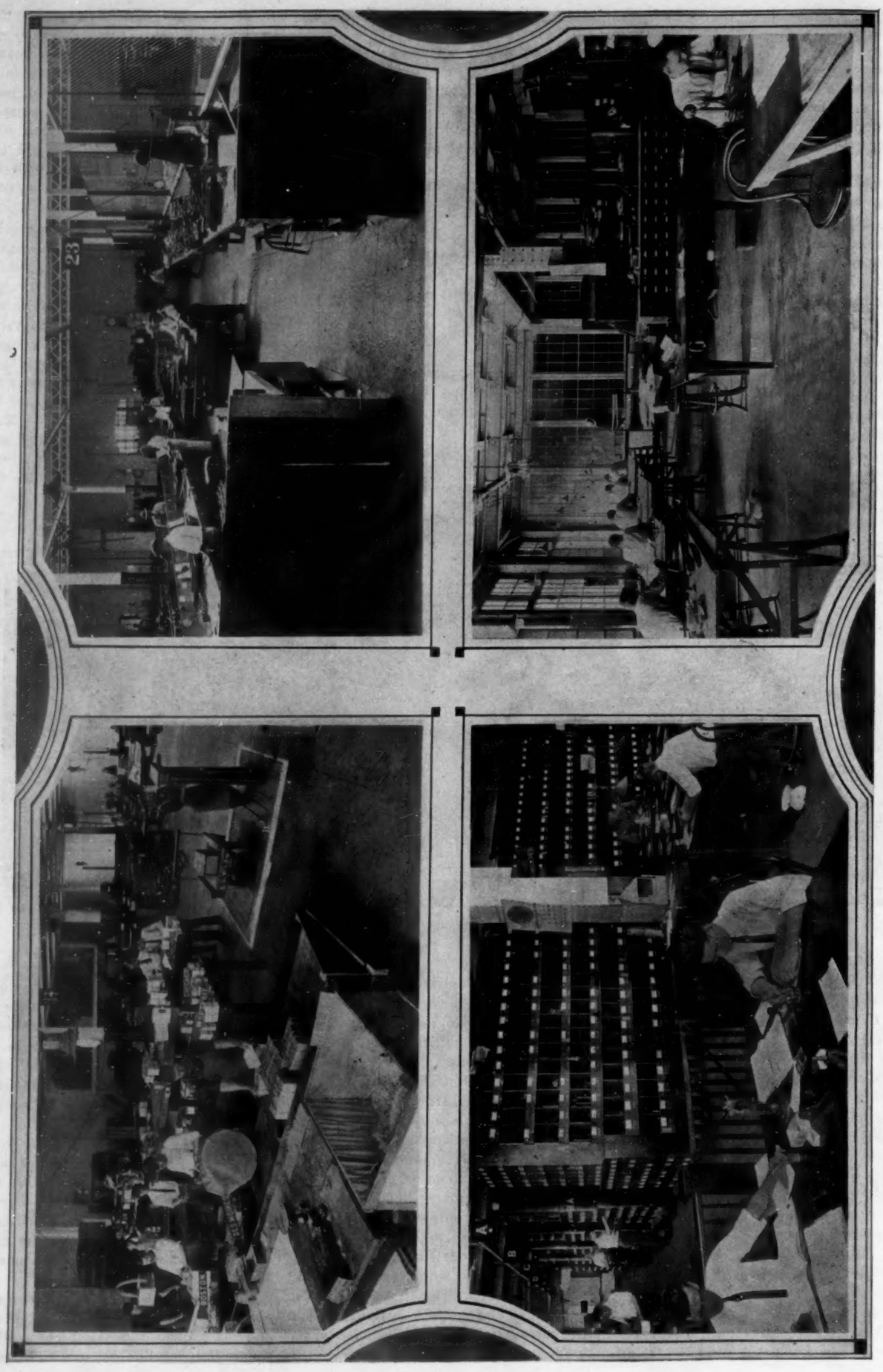


FIG. 10—INSPECTING PARTS BEFORE DELIVERY TO STOCK
FIG. 12—REPRODUCING DRAWINGS FOR PARTS OF OLD MODELS

FIG. 9—PARCEL POST SHIPPING ROOM
FIG. 11—ASSISTANT STOREKEEPER'S OFFICE IN THE STOCK ROOM

building, containing the storage department, is 722 feet long, 60 feet wide and three stories high. Back of it is a machine shop with a saw-tooth roof, 500 feet long and varying from 400 to 250 feet in width. Parallel to the machine shop is a forge shop 352 x 60 feet. The shipping room, together with the Columbia stock room and pattern storage is 251 x 122 feet. The machine shop, Figs. 2 and 5, has been equipped with a large number of automatic machines and with over a hundred standard lathes, shapers and planers. A feature of the equipment is a battery of Gleason automatic bevel gear planers shown at the left in Fig. 2. The forge shop, Fig. 1, contains the usual equipment including a large number of board drop and steam hammers, together with the necessary trimming presses and heating furnaces. A number of special, oil-burning, heat-treating furnaces also have been installed. Immediately adjacent to the forge shop is the die storage department, Fig. 6. The dies are all carefully sorted and indexed. The auxiliary departments include a well-equipped laboratory where all of the incoming material is analyzed to make sure that it measures up to the specifications. Power is furnished from a central station which includes a direct-connected Allis-Chalmers Corliss engine and an Allis-Chalmers turbo-generator unit. Among the provisions for the welfare of the employes is a base ball park said to be one of the best in the state of Indiana.

As previously mentioned, the stocks of parts, dies, jigs, tools, etc., in various sections of the country belonging to the defunct United States Motor Co. were concentrated at the Newcastle plant as the first step toward bringing order out of chaos. In the initial shipments there were over 126 carloads and nearly as many more have been received since the first heavy consignment in the spring. When this material started and when it arrived, it was apparently a hopelessly mixed mass. As the work of indexing and sorting proceeded, it was found that the records were in many cases pitifully inadequate and that valuable drawings and data were missing. For some of the earlier models it seemed as if drawings had never been made and that no records had ever been kept. It was decided that much of the information which was necessary could not be secured except through former employes of the old company who had been personally familiar with the production of the numerous makes and models. These men carry in their minds information that exists nowhere else. Accordingly the country was scoured for them and as many as could be were induced to come to Newcastle. Particular efforts were made to locate old stock room employes who were familiar with the various models and could probably tell from memory where certain drawings and jigs were located or from which model of which make a certain part came. Some of the men had died, some had gone to Europe and other were so employed that they did not care to make a change; however, a sufficient number were rounded up to assist materially in the problem of classifying and indexing the vast stock of material that had been collected.

As soon as this work was completed, an inventory was available which showed exactly how much stock there was on hand and what parts it would be necessary to manufacture. At this point new problems arose, for in many cases the original shop drawings and records were missing. It was necessary to reproduce such drawings from samples of the old parts and other data and a number of draftsmen have been busy at work at this for months. New patterns, jigs and dies also were required in many instances and facilities were installed at the Newcastle plant for their production. For some of the parts of the earlier models there is a very limited demand, and it was necessary in these cases for the machine shop superintendent to decide whether it would pay to make new jigs and dies or not. In some cases it was believed this would be a waste of money and a few of the parts required were made by jobbing shop methods. This necessitated the employment of a larger proportion of high grade mechanics than is required in many automobile plants.

The machine shop superintendent also had to decide on the limits of accuracy to which it would be necessary to manufacture the parts. This involved an intimate knowledge of the various old models to avoid misdirected effort. Money could easily be wasted by making the parts to closer limits than was actually required, but

FIG. 13—STOCK OF CRANK CASES AND OTHER HEAVY PARTS

FIG. 14—TOOL BOXES AND LIGHT SHEET METAL PARTS ARE PILED ON THE FLOOR. WHEELS ARE STORED IN RACKS

FIG. 15—FILLING ORDERS IN THE SMALL PARTS STOCK ROOM

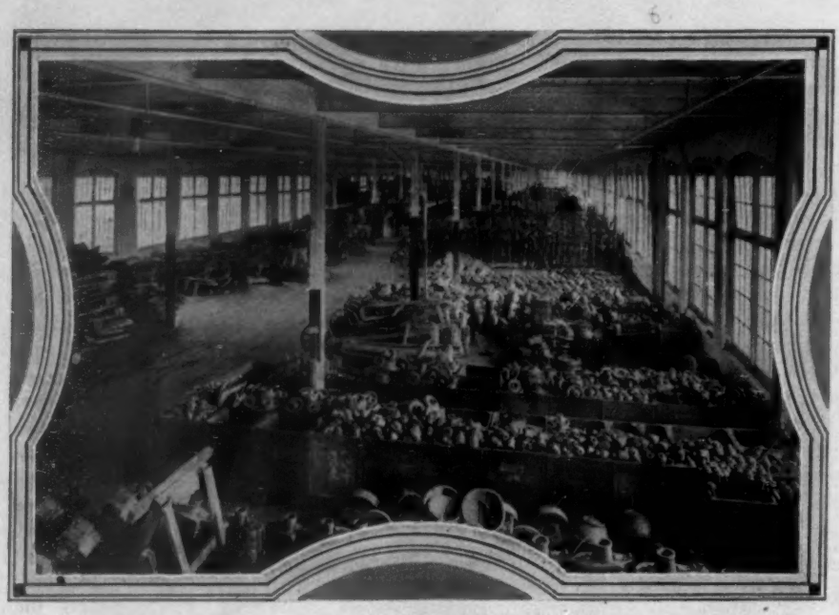


FIG. 16—A FLOOR IN THE STORAGE BUILDING SHOWING STOCK OF CYLINDERS, AXLES AND OTHER HEAVY PARTS

on the other hand, endless trouble with the car owners would ensue if parts which should be closely machined were turned out inaccurately and, therefore, failed to fit or to perform their functions properly. The builders of some of the old models were not as careful about interchangeability as are modern manufacturers and these variations had to be considered in making up the parts for replacement.

An effort also has been made to correct some of the faults in the design of some of the old cars. In some cases parts were originally made too small, resulting in numerous failures. These are being eliminated gradually by supplying new parts made from special analysis steel having the necessary strength or rigidity. The experience of metallurgists is of considerable value in this connection because the sizes of the old parts are, of course, rigidly fixed within narrow limits and the only method of obtaining increased strength is by improvements in the steel.

Storage Building

As a result of the work which has been done at Newcastle, an owner of any of the old models made by the predecessors of the Maxwell Motor Co. can obtain new parts at a reasonable price without delays. The storage building has a total floor space of 130,000 square feet and contains over 45,000 separate bins. There are literally miles of bins and in addition there are hundreds of racks for storing radiators, mud guards, frames, axles, etc. A few characteristic views of the stock rooms are shown in Figs. 13, 15, 16 and 17. In some cases the parts are carried in substantial wooden tote boxes mounted on casters as shown in Fig. 16. The bins for the small parts, Fig. 15, are arranged in tiers twice the height of a man. A ledge at a height of about 4½ feet makes the upper part of the bins accessible without a ladder. The bins have been constructed of wood throughout for reasons of economy. There was a large stock of old lumber at the plant when the Maxwell Motor Co. took it over and much of it was used in making the bins. The bin partitions are usually 1 inch thick and all of the woodwork is painted black. For protection against fire, the entire plant has been fitted with an extensive automatic sprinkler system which draws its supply from a large storage tank situated near the power plant.

To facilitate the work of handling the stock, the parts for each different make of car are kept in a separate division or department of the stock room under the supervision of an assistant storekeeper. The clerical force in the office is also similarly divided. Thus one set of office clerks and stock room clerks take care of all the orders for Maxwell parts; another set handles the orders from owners of Stoddard-Dayton cars, while still another group looks after the Columbia orders, etc.

Record System

A simple order routine and record system has been installed. The customer's order is transferred to a shipping order, which is manifolded on the typewriter in quintuple. These order blanks are the size of an ordinary sheet of letter paper, that is 8½ x 10½ inches, and, therefore, may be filed conveniently in an ordinary, standard vertical filing case. The original, which is on white paper, is sent to the stock room and when the order is filled is transferred to the office files. The first copy on red paper also goes to the stock room for the stock department file; the second copy, salmon-colored, is shipped with the goods to the customer; the third copy, yellow, is filed with the correspondence from the customer thus forming a cross index, and the final copy, blue, is an acknowledgement of the order which is mailed to the customer before the shipment is made. The original copy, of course, must pass through the accounting department on its way to the files for billing purposes. Each

FIG. 17—RADIATORS FOR OLD MODELS

shipping order bears a consecutive number together with a characteristic letter which indicates at once the make of car for which the parts are required.

Each part kept in stock bears an individual number and this number is entered on the shipping order by the order clerk before he sends it to the stock room. At the latter point, a card index of the parts is kept, arranged consecutively, according to number. These cards show the bin and section number in which the parts are kept and also contain spaces for the record of the number of parts received and shipped together with the daily stock balances. When a shipping order is received in the stock room, the clerk first refers to this card index in order to find out where the parts are located and also to make a proper entry of the number of parts ordered on the card. As indicated in Figs. 10 and 15, each bin also is provided with a stock record card. This card is slipped into a light metal frame screwed to the front of the bin. It contains simply a numerical record of the number of parts received, the number shipped and the number on hand.

Every day the chief storekeeper is furnished with a statement showing the number of parts of each kind on hand, thus keeping a continuous inventory. He also is furnished with a shortage record which shows stocks that are exhausted or nearly so. The orders to the manufacturing department are based on these reports and in determining the number of parts to be manufactured, a statement of the total shipments for the previous six months is obtained. The superintendent of service also is furnished daily reports showing the conditions of the stock together with the number of orders received and filled and other necessary information.

Sometimes the customers send in sample parts for duplications. Such parts are delivered to an inspection department, which identifies them and makes out a correct shipping order. This department also passes on the parts that have been returned as defective, for which the customers ask replacement without charge. An inspection department also is conducted in connection with the machine shop to prevent imperfectly made parts from being delivered to stock.

Fig. 9 shows a typical portion of the shipping department. The parts are shipped by freight, express and parcel post. The Newcastle plant is served by three railroads, including the Pennsylvania Lines, the Big Four system and the Lake Erie & Western. Three express companies,, the Adams, American and United States, have offices in the city. It is interesting to note that the majority of the parts come within the 21-pound weight limit and, therefore, are sent by parcel post. This is a great saving, especially for owners who live in rural districts. The weekly postage bill on parts shipped by mail amounts to $165. In addition, something over 25 tons per week go by express and such large parts as axles, etc., which go by freight make up another 25 tons. The weekly shipments by parcel post weigh about one ton. In the busy seasons of the year, an average of 500 individual orders by day are handled and at the present time 50 per cent of the orders are filled within 24 hours and 97 per cent within 48 hours. The Newcastle plant deals with car owners in all parts of the country except the extreme eastern and western seaboards. Smaller auxiliary stocks are carried at New York and San Francisco.

Steam Economy of a Reversing Engine

The competition between steam and electric drives for rolling mills has proved to be a healthy stimulus to the designers of steam reversing engines, with the result that the economy of such machines recently has been greatly increased. In the Aug. 14, 1913, issue of THE IRON TRADE REVIEW, page 289, was published a description of additions recently made to the plant of the Youngstown Sheet & Tube Co., Youngstown, O., and included in this installation was a 46-inch and 76 x 60-inch twin tandem compound reversing engine built by the Mesta Machine Co., Pittsburgh. This engine was shown on page 296 and a plan and sectional view appeared on page 297 of that issue.

As shown in Fig. 1, it will be noted that the engine is operated by one controlling lever, *A*, which operates the relay valve and this in turn controls both the reversing links and throttle. When the main reversing lever is in position 1 or 2, the throttle is wide open and when in position 3, the throttle is closed. The pressure of steam, and the cut-off with which the engine works, therefore, are interconnected so that at light and mediumly heavy loads the operator is compelled to work with a combination of throttle and cut-off control. While operation with cut-off is theoretically possible with any two-lever reversing engine, it would require great attention and skill on the part of the operator. Investigation shows that most operators give maximum cut-off at the beginning of the pass and then control by throttle alone. Fig. 2 shows conclusively that cut-off is attained with single lever control, these indicator cards having been selected at random

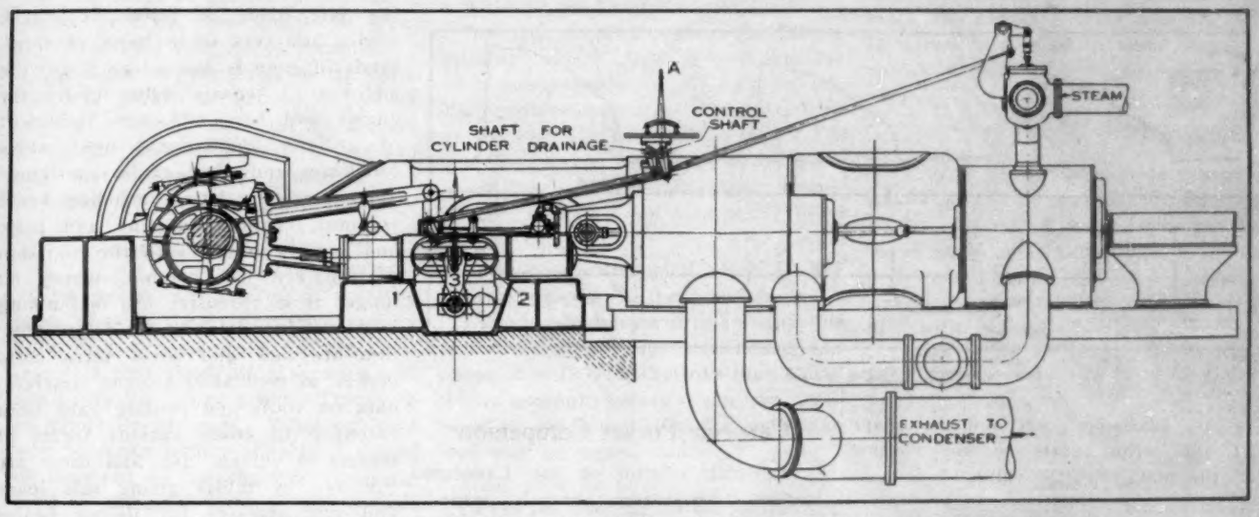


FIG. 1—TWIN TANDEM COMPOUND REVERSING ENGINE, SHOWING CONTROLLING LEVER

from those taken during the test. The opening of the throttle is not simultaneous with the movement of the reversing lever from point 3, Fig. 1, as there is an idle stroke of the throttle valve. When the latter opens, steam is admitted through auxiliary ports in the bushings of the main piston valves and this combination of idle throttle valve travel and auxiliary ports makes possible smooth and certain starting in any position of the cranks. These auxiliary ports admit steam during the regular operation of the engine, that is, during the rolling process. While these ports are large enough for quick starting, they are too small to affect the form of the regular indicator cards or the steam consumption of the engine. It is claimed that the success of the engine depends not so much upon the auxiliary ports as upon the careful proportioning of the throw of the eccentrics, the length of the links, the size and location of the auxiliary ports and the shape of the steam ports in the bushing of the main throttle valves.

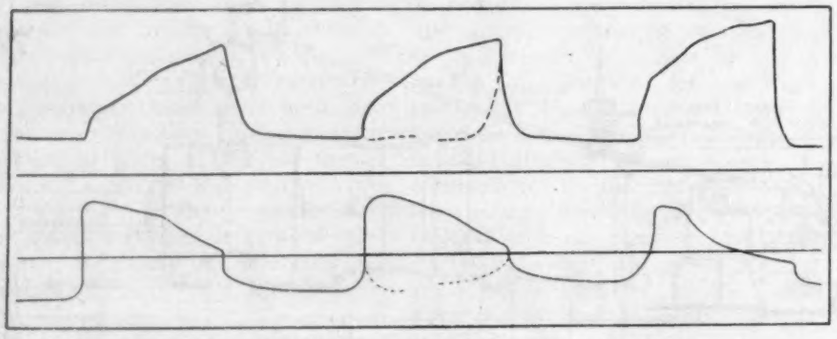


FIG. 2—INDICATOR CARDS TAKEN DURING THE TEST

Test Data

On Nov. 28 and 29, 1913, a test of this engine was made by engineers of the Youngstown Sheet & Tube Co., Carnegie Steel Co., Mesta Machine Co., and professors and students of the Carnegie Institute of Technology, Pittsburgh. The test data and results were carefully checked by all of the interested parties. The steam consumption of the engine per indicated horsepower-hour was found to be between the limits of 20 and 22 pounds, depending somewhat upon the method of rolling, so that 21 pounds may be considered as the average. This steam consumption is low and shows steam economy of from 6 to 15 pounds per indicated horsepower-hour as compared with engines running condensing.

To ascertain whether the new method of control would permit of the quick handling of the engine, the time for reversal was repeatedly tested. The average time of change from 60 revolutions per minute in one direction to 20 revolutions per minute in the other direction was found to be 2.2 seconds. Since the speeds noted ordinarily are found at the end and at the beginning of the passes respectively, this period, namely 2.2 seconds, may be termed the mean interval required by the engine for reversal. As a rule, the manipulation of the ingot requires a longer time than that consumed by the engine for reversal.

The test data were taken simultaneously by 15 observers and in addition to these there was one general overseer of the test. This engine has required no keying-up, setting-up or repairs since its installation in July last year. The condenser for this installation also was built by the Mesta company and during the heaviest rolling the vacuum never leaves the range between 27 and 28 inches of mercury (referred to 30 inches barometer).

Carnegie Pocket Companion

The 16th edition of the Carnegie Pocket Companion, recently issued, has been thoroughly revised so that it represents fully the present status and the most improved methods in the art of steel construction. The first edition of this volume, issued in 1876 in connection with the Centennial Exposition at Philadelphia, was published by Carnegie Bros. & Co., proprietors of the Union Iron Mills, Pittsburgh, now one of the units of the Carnegie Steel Co. and the first of the mills rolling structural shapes. The original edition dealt exclusively with iron. The 15th edition of this work was issued in 1903, approximately 10 years ago, and represented the status of the art at that time. The distribution of this edition aggregated several hundred thousand copies. This book contained profiles of practically all of the shapes then manufactured by the Carnegie company.

In the decade which has elapsed since the publication of the 15th edition, the Carnegie Steel Co. has turned its attention to the manufacture of a diversified line of products and it no longer is practical to include in one publication all of the various shapes now made. Therefore, in the 16th edition, only those rolled shapes are illustrated which are considered most suitable for bridge building and car and ship construction, and the tables included are intended for users of materials entering into such construction work only. The principal additions and changes made include the following: American Society for Testing Materials, standard specifications for structural and other steels and the American Bridge Co.'s specifications for workmanship; light weight beam sections from 8 to 27 inches inclusive; tables and data on concrete reinforcing bars; the extension of tables and formulas on elements of sections; new treatment of the subject of stresses in beams; new flexure formulæ and the computing of the safe loads of beams, channels, angles and tees on a basis of thousands of pounds instead of tons; the addition of tension value tables for angles and bars and new treatment of grillage foundations; new tables for beam and plate girders, columns and struts, the latter including beam columns, channel columns and plate and angle columns with the omission of the zee bar column, which no longer is in extensive use in building construction; data on floor construction are new and cover terra cotta arches, as well as reinforced concrete; data on roofs and roofing have been extended to cover various forms of trusses in current use, and these are followed by tables giving safe loads and unit stresses for timber beams and columns.

The pages covering weights and measures are unusually complete and they include convenient metric conversion tables on a new basis. While as compared with the 1903 edition this book contains approximately only 80 pages additional, owing to the omission of certain profile pages, the increase in the size of the page and the condensation of the material, the amount of engineering data contained in the book has been practically doubled. The work is printed on thin, opaque paper of a carefully selected tint and reflects great credit from a typographical standpoint. Copies may be obtained from any of the offices of the Carnegie Steel Co. at a price of $1.

Tentative plans are in progress for the reorganization of the Pope-Hartford Co., Hartford, Conn.

Making the Gray Iron Foundry Pay Dividends*

. Pertinent Suggestions on Management, Shop Operation, Mixing Iron, etc., That Will Make the Casting Shop Profitable

By Stuart Dean

It is difficult to make money in the foundry business because of the great competition in that industry. It probably takes less capital to start a foundry than any other manufacturing plant. A shack of a building, an old boiler shell for a cupola, a fan, a pile of sand, a number of home-made wooden flasks, is about all the permanent equipment necessary to start in the business. Note that I emphasize the word start.

There are always enough people outside of manufacturing who think that they want to get into manufacturing, to back up some ambitious foundry foreman. Woe be to them.

The business seems to be an ideal one. It seems to be simple to an outsider. Merely sand tucked around a wooden pattern, pattern drawn out and the molten iron poured in—an immense selling field at the door.

Great Profits—On Paper

The greenhorn figures it out on paper that at the conservative rate of only 10 per cent profit on the castings, his first shack of a foundry will run easily $25 a day profit. This with no effort on his part. What an ideal way to make money—having a crowd of men out in the shack all working hard to make his fortune. He doesn't know that it takes an all-around genius to make a success of the foundry business.

All the troubles in a foundry happen out of sight. It is different from a machine shop, where if parts fail to go together the machinist can take them apart, measure them up and correct the trouble. The machinist can see with his eyes just what is wrong.

None of the troubles in a foundry happen where they can be seen. They happen inside the cupola, inside the mold, and, quite often among the men themselves.

A foundryman not only must know how to make castings from A to Z—which is a problem big enough to occupy all his time—but he must be able to get an enormous output from the men. That is his job during the day. In the evening he must read market reports and decide whether pig iron is going up or down, and incidentally figure a little on how he is going to pay his bills—study out the best method of approaching the banker to borrow money.

After going to bed he must lie awake studying what he had best do about the demands being made on him by the union.

I remember sitting at a foundrymen's meeting at Indianapolis and looking down the table at the faces of the foundrymen. I tell you they were a sober looking bunch. No one saying a word to his neighbor.

Different from a professional men's meeting, where they are all smiling with not a single care in the world. The professional man lets the client or patient do the floor-walking. He gets his pay no matter what mistakes he makes. The foundryman's case—no cure no pay. He must make good or get out.

There are foundrymen who do make a great success of the business.

I know a foundryman in Indianapolis who lives in an expensive house, has automobiles, and, more than that, makes enough money from the business to invest outside, which is the real test of money-making.

How does he do it?

Is his success due to his equipment, molding machines, sand conveyors, electric drive; pig iron, coke, casting analysis; clothes closets, shower baths, washrooms, rest rooms, amusements for the men; being union or being open shop?

No.

Can you find the cause of his success stated in any articles on foundry practice?

No, you will not find it in any literature that I know of.

The three points that make his success, in fact, make every firm's success, seem to be carefully avoided by all writers and speakers on foundry topics. These points are:

First.—Capable assistants who insist on having only capable workmen under them.

Second.—Strong pressure from the manager brought to bear on these assistants, forcing them constantly to do their best, and,

Third.—Allowing these assistants free hand; never handicapping them in the least.

I will repeat these three points:

First.—Assistants many times more capable than the manager himself.

Second.—Simple statistical reports that state the total amount of work turned out by each one of the departments, so that constant pressure can be brought to bear on the department heads. These reports will be total tonnage reports compared with total hours labor, and

Third.—Make each department head understand that since wonderful results are expected from him, he will be given free reign to make improvements, drop poor men and put on better.

Brain in the Mixture

A steel foundryman once stated it pretty well. He was asked what was it that he mixed with his steel that made such perfect castings. His answer was "brains".

The proprietor must surround himself with brains.

I was riding in a Pullman car with two bankers last summer, when a gentleman walked through the train. One of the bankers said, "Do you know that man? He is the general manager of the X State Telephone Co."

The banker went on to say that a certain trust company held a large block of bonds of the Telephone company. From mismanagement, the price of the stock had gradually dropped to 26, and the trust company began to fear it would lose its money on the bonds; one of the bank officials was elected president of the Telephone company at a salary of $12,000 a year, and in a short time he changed the business from one that was losing money to one that was making money. In a year the stock advanced from 26 to above par and bonds in the hands of the trust company changed from worthless paper to gilt edge security.

How did he do it? He got brains to help him. He went east and got the best practical telephone manager in the country. Offered him $20,000 a year to take charge of the Telephone company; $20,000 was $8,000 more than the president himself was receiving.

This is the only case that I know

*Presented at the February meeting of the Pittsburgh Foundrymen's Association.

of where a man at the head of a business paid a man under him a great deal more than he himself was making.

The president realized that it was necessary to have the most capable assistants that he could get, no matter what it cost. He understood that it took the best brains procurable to pull that telephone company out of the hole.

In our town there was a man who never attended very closely to his business. You could generally find him at the club playing pool during business hours. He was in the paper mill business. He made quite a success of his business. He depended on a splendid manager, whom he employed to attend to everything.

Another Case of Manager

After the owner died the business went on about as usual until the widow of the owner called in a lawyer to look over the business and see if everything was running right. This lawyer was astounded at the salary being paid to the manager. The manager was an unprepossessing looking man. As some one once said—"Nature often wraps up her most valuable packages in very poor looking covers". Such was the case of this man.

The lawyer could not believe that such an uncouth looking fellow needed such a large salary, so he advised the widow to reduce the salary, which she did. The manager quit. The firm failed. The widow lost her big house —moved into small apartments and tried to make a living teaching bridge. My brother met the widow's son the other day on the streets of Louisville, and gave him a dollar. He was down and out. The paper mill had lost its managing brains.

Andrew Carnegie understood that the most important thing about a business was the smart men who managed it. He understood that everything else was dwarfed in comparison to this one thing. He said, "If I were forced to choose between losing on the one hand everything material—my mills, land, equipment, etc., but could keep my personnel, that is, all my managers; or, on the other hand, had to lose all my managers and department heads and could keep all my material wealth, I would hold my managers and let my material wealth go, because I could get my material wealth back in a much shorter time than I could my fine organization".

Foundries cannot pay very large salaries, nor will raising salaries produce more brains in anybody. The brains in men are a fixed quantity.

If you have a wonderful department head, don't let him get away from you if more money will hold him. Or, if you can find a better department head than you now have, put him on, even if you have to pay him more money than you have paid in the past.

An assistant who can reduce costs is worth extra pay. The thing of first importance is for the manager to surround himself with only the best men.

He must have the kind of foreman that will see to it that each man puts up an enormous number of molds a day. The tonnage turned out per man in successful foundries is enormous.

In an Ohio agricultural foundry, each molder puts up a line of floor molds nearly 60 feet long, cuts his own sand, and pours his own molds, carrying some 1,500 to 1,700 pounds of iron. The men make $5 per day by piece work. Any man who can't earn that amount is not wanted. On a hot day, the perspiration runs out of the bottoms of their trousers.

The manager must have the kind of foreman that will get such tonnages from the men.

A curious thing about this foundry is that not a single molding machine is installed. Molding machines would facilitate production greatly. This illustration goes to show that it is management, and management only, that makes success. Here is a plant poorly equipped, but still makes a success.

How to Find the Man

The next question is:—How are we going to find these wonderful geniuses to revolutionize our business? And when we get one, how are we to know he is the best, or how are we to know that our present assistants are not better than any we could get?

There is only one absolute true way of finding out and that is to split the foundry up into small units, each as nearly independent and separate from the others as is practicable, with only 20 or 30 men in each unit. I say 30 because that is as great a number as ever should be under one overseer.

If you run nine hours a day, and if each foreman could give all his time to overseeing the men's work—which, of course he can not—it would allow him only about 13 minutes' time in the morning and 13 minutes' time in the afternoon to each workman.

If you hope to squeeze the last drop out of the lemon, it certainly will take this amount of overseeing for each man.

In the agricultural implement foundries of the International Harvester Co., at Chicago, I am told, the art of molding is brought down to such a fine point that they know just how many times to peen around the edge of a cope to keep it from falling out. If it takes 10 strokes they do not allow the man to use 12. If the man can strike-off the mold in one stroke, he is not allowed to do it in two. If the bench man can economically carry out the whole mold to his floor, he is not allowed to make two trips—one trip to carry the drag and the second trip to carry the cope.

This borders on scientific management, but has the bad part of scientific management eliminated.

In this system of small separate foundries you don't care how each small foreman manager arrives at a low cost of castings and a perfect product. It is up to him. As far as you are concerned, he can get it by replacing his poor men with rapid producers, or he can get it by constantly digging at his poor producers and teaching them where they fail.

Rise of Capable Foremen

Each little foundry division is under the strongest kind of competition with its neighbors. There will be the greatest exchange of ideas between the different foundry foremen as to how they make good.

The capable foremen automatically will come to the top. You will replace the poor ones with new ones, and finally get an organization that will produce castings at a cost that will make you rich. The salary paid each of the small managers will not be high, he being a foreman over a very small number of men and easily can be replaced.

Straw bosses—one over every 20 or 30 men, will not take the place of these small foundry managers, because straw bosses are always handicapped by the foreman above. The foreman above them too often says "no" to their proposals. Their full power is constantly being clipped. There is not the incentive to make good, nor the necessity that there is with the small department manager.

The Westinghouse Machine Co. has had to split its business into small, separate units, with separate books for each department. The Baldwin Locomotive Works has always built its locomotives under the contract system, which is practically the same thing. A man takes a contract to make tanks for tenders, for instance. He hires and fires his own men and has, practically, full management of his one job. The Cadillac automobile is built in the same way.

The Ford automobile is made in separate, distinct factories—many of them not owned by Ford. The engines in one factory, rear axles in another, the

tops in another, the screw machine parts in another, etc.

Think what a simple business a retail merchant has buying at one price and selling at a higher price, yet he can't make a success of a big department store save by splitting it up into little stores.

Our department stores consist of little stores, separate and distinct each from the other, a manager over each who decides what he will buy and what not for his little section. The books are separate for each department. The department must make a success or get out. We shall all have to adopt this scheme sooner or later.

Tabulated Records

The method to pursue to bring strong pressure to bear on the department heads consists of the adoption of the tabulated records, which are as follows:

First.—Number of pounds of good castings turned out each month by a department.

Second.—Total foundry hours of the department per month.

Third.—Molders' hours only, per month.

Fourth.—Helpers' hours per month.

Fifth.—Coremakers' hours per month.

Sixth.—Casting cleaning hours per month.

Seventh.—Hours of any other class of help, such as cupola, crane men or foremen.

Divide the first item, or the number of pounds of good castings turned out by the department, by each of the following items, and, multiplied by the hours in the work day, gives the following records:

The day's output for each molder.

The number of pounds of castings each foundry helper helps on each day.

The number of pounds of castings a day each coremaker makes cores for.

The number of pounds of castings each cleaner cleans each day.

The number of pounds of castings turned out per capita of all other help (cupola, crane and foreman).

Comparison of these department records, month by month, will soon tell which department head is making the best showing.

Changing the Work

Often a change in the class of work will interfere with a department making a good record. A foreman who is a real genius will improve his record in the face of a change in the class of work that requires increased labor per pound of product.

These tables should be kept graphically, because they will present a picture of conditions in the most comprehensive manner, where more tabulated figures fail.

It is a splendid idea to give each foreman a quarterly written statement of the pounds output per man for each class of the help he has under him. This acts as a spur to the foreman. The foremen take the keenest interest in these reports. To them the reports are a tangible statement which they can compare with their records of previous years. These reports keep reminding them that hours wasted will injure their record. A lazy man, a man who spoils work, or a slow man will not be tolerated, because such men increase hours without increasing the output.

The foreman will call the manager's attention to ill-shaped castings, patterns with lack of draft, the unnecessary hanging of cores in the sides or cope, of molds under rammed, or patterns on which loose pieces are used that could be eliminated by a change in design.

Good assistants and bringing pressure to bear on them, are by far the most important things in making a success of the foundry business.

The second most important thing in making castings is the use of analysis in making iron mixtures, because this reduces the material expenses and improves the product.

All the material bought by a foundry may run a little over 1 cent for each pound of castings, yet a foundry will try to strain the output per man and pay no attention to the heavy expense of running a mixture half of which is costly pig iron.

Cheap Mixtures

A foundry using a minimum amount of coke in the cupola, so that the increase in sulphur from melting is small, will be forced to use two-thirds cheap pig iron or scrap. To obtain a mixture for a casting analyzing 1.80 per cent silicon, 0.80 per cent manganese, 0.60 per cent phosphorus, and 0.10 per cent sulphur, more than two-thirds off-grade iron will have to be used. The above analysis will make a fine iron—close-grained, strong and soft.

In our foundry, before mixing by analysis, we used 40 to 50 per cent scrap in the mixture. After the adoption of the method of making mixtures by analysis, we ran four months averaging 74½ per cent scrap, or off-grade iron at scrap iron prices, in the mixture. During tri-weekly periods of this time, the mixture contained 80, 77, 73 and 69 per cent off-grade iron. During these four months, our castings analyzed as follows:

	Per cent.
Silicon	1.61 to 1.99
Manganese	0.69 to 1.24
Phosphorus	0.32 to 0.68
Sulphur	0.050 to 0.118

with an average of

	Per cent.
Silicon	1.82
Manganese	0.90
Phosphorus	0.55
Sulphur	0.094

It is strange that all foundries do not make their mixtures by analysis.

The essentials of the subject can be mastered in an hour's time. The condensed statement of iron mixing can be completely told in a comparatively few words.

Essentials of Iron Mixing

There are only five elements that affect the mixture: Three of these change during melting; the other two do not. Silicon and manganese reduce in amount and sulphur increases. It is a game played with a pack of five cards and it is a question of what combination can be made with five elements.

When an element is present in an iron above the normal amount, it changes the quality of the iron in a fixed direction, provided the other elements are at the normal point.

Silicon softens, weakens and increases fluidity, and increases sponginess.

Manganese softens, strengthens, closes the grain of the iron and cleans it.

Total carbon, above normal, will allow a large reduction in the silicon.

High sulphur strengthens the iron and hardens it. Sulphur makes the iron sluggish.

Phosphorus, above normal, gives great fluidity to iron, but makes the castings weak and brittle.

Total carbon divides in the casting into graphitic carbon,—the carbon that makes the machinist's hands black—and combined carbon,—or carbon that is actually combined with the iron. When graphitic carbon is high, the iron is soft and weak and the castings are spongy.

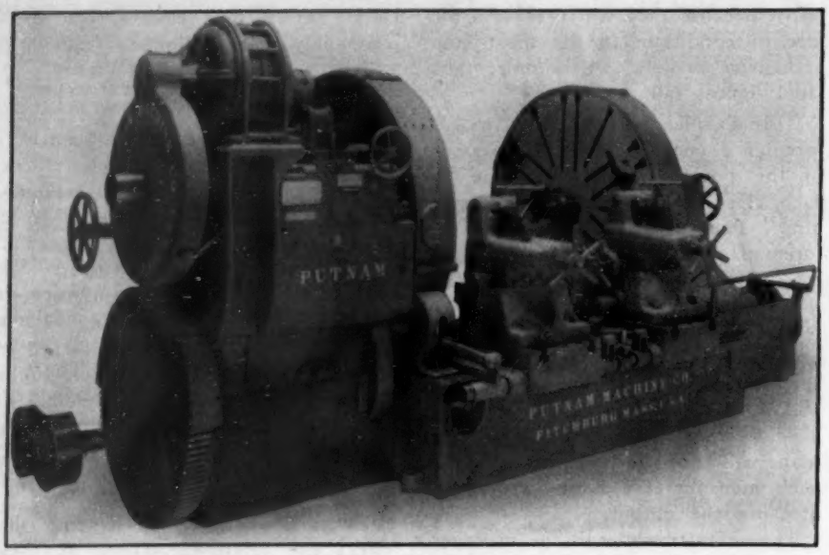
The proportion of the graphitic carbon to the combined carbon is purely a result of the proportion of the other elements, also the mold conditions.

Manganese Desirable

Of all the elements, manganese is the most desirable. It has no bad qualities and all the good qualities. It not only offsets the sulphur effects, but actually removes sulphur.

High manganese with high sulphur will make a softer casting than low manganese and low sulphur.

(*Continued on page 398b*)



HEAVY PATTERN PUTNAM DRIVING WHEEL LATHE

Putnam Driving Wheel Lathe

An improved model of its heavy pattern driving wheel lathe has been designed by the Putnam Machine Co., Fitchburg, Mass., one of the subsidiary companies of Manning, Maxwell & Moore, Inc., New York City. This machine is built with a nickel steel driving shaft, ring-oiling bearings, all-steel gears, and has power movement to the tailstock. It may be arranged for belt drive, variable speed motor drive, and in the latter case six mechanical speed changes may be provided. For motor driving, a 50-horsepower motor is required.

In the accompanying illustration is shown one of these machines equipped with a single clamp tool holder. It also may be provided with a combination tool holder which carries both roughing and forming tools. Each machine is provided with driving dogs of the self-equalizing type.

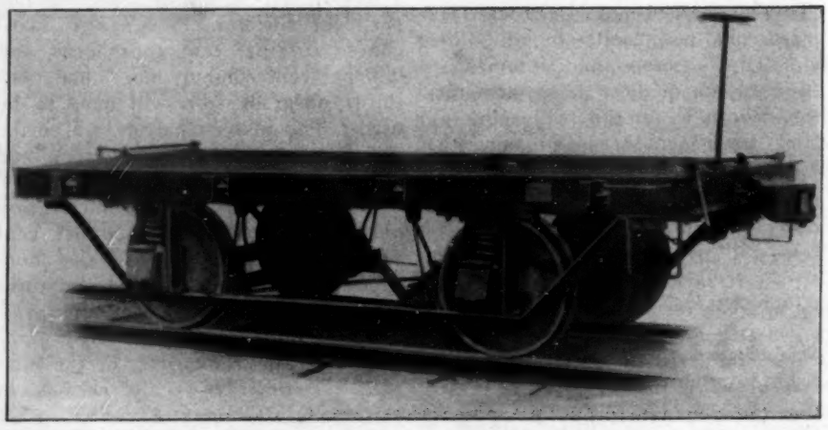
The feed is taken directly from the main driving shaft to the center of the bed. All gears are covered. The tailstock may be operated by an independent motor or by independent countershaft. The spindle is of unusually large diameter and is provided with large bearings. The main face plate gears are cut and bolted to the face plate.

This lathe may be equipped with single or double quartering attachment, and also may be provided with independent journal turning attachment and with attachments for turning trailer wheels with outside journals. Attachments for turning coach wheels also may be furnished. The calipering attachment is a part of the general equipment.

This type of heavy pattern driving wheel lathe is built in three sizes, to accommodate 79, 85 and 90-inch wheels. Each has a uniform output of a pair of wheels per hour, this being a minimum, rather than a maximum figure. The 90-inch lathe weighs approximately 120,000 pounds.

Car for Yard Service

In plants where heavy material must be handled in a storage yard and where there is no crane service, a large capacity platform car is well adapted for this work. The Watertown Arsenal, Watertown, N. Y., recently has purchased a number of cars of this type from the Orenstein-Arthur Koppel Co., Koppel, Pa. As shown in the accompanying illustration, this car has a capacity of 30 tons, is of steel construction and is equipped with standard couplers and draft gear. However, it has only a single truck and is only 16 feet in length. Therefore, it is comparatively light and easily can be moved by a track mover or a horse when no locomotive is available.



SINGLE TRUCK CAR FOR YARD SERVICE

Cincinnati First, Cleveland Second

A report prepared by the industrial bureau of the merchants' association of New York shows that in the manufacture of metal-working machinery, according to the 1905 census report (the latest available), New York ranks third, Cincinnati comes first, the total value of the machinery produced there having been $3,200,889; Cleveland comes second, with $2,740,618; New York third, with $2,014,970; Philadelphia fourth, with $1,688,908; Providence fifth, with $1,651,292; Worcester sixth, with $1,079,772. During the year, according to the census reports, the total value of such products produced in the United States was $32,408,766.

Will Celebrate Fiftieth Anniversary

An impressive gathering of engineers will be held in New York May 28, 29 and 30, when the School of Mines of Columbia University celebrates its fiftieth anniversary on Morningside Heights. A committee from the trustees, faculty and alumni has been at work on the plans for some time, and the general program provides for a reception on the first day in the gymnasium; big meetings at the university on the second day, at which eminent scientists will speak, with a banquet at the Waldorf-Astoria in the evening, at which Prof. James Furman Kemp will preside and well known alumni will speak, and trips about town on the morning of the third day, winding up with a baseball game between the 'varsity nine and another college team in the afternoon on South Field. Dean Frederick Arthur Goetze, of the School of Mines, Engineering and Chemistry, is going to start in a few days on a trip visiting many cities where graduates of the School of Mines are located, to see them personally and invite them to aid in the celebration.

Effect of Oxygen on Quality of Cast Iron---I[1]

Results of Experiments by Which Ordinary Coke Iron is Converted Into Iron of a Grade Equal or Superior to Charcoal Iron

By J E Johnson Jr.

The doctrine of chemical control of the quality of pig iron met some obstacles when first presented. These were unimportant but exceedingly difficult of removal. The old school of metallurgists, who knew but little chemistry, had always insisted that there were fundamental differences in quality which were not revealed by analysis. The more ardent advocates of the newer theory of chemical control ridiculed this view. Those whose position forced them to look for the facts from whatever source derived came gradually to believe that while the theory of chemical control was in a broad way correct, there was certain facts which this theory did not cover, and that the old-school metallurgists, while wrong in many of their notions, were undoubtedly right as to this. This view now seems to prevail among those best informed on the subject.

In our search for the explanation for these discrepancies, there seemed, after the most careful consideration, to be two facts which might be taken as established:

1.—That certain irons possessed a quality as they came from the furnace which was preserved on remelting, and which reappeared in castings of which these irons formed an important ingredient.

2.—That the rarer elements, such as nickel, cobalt, chromium, titanium, vanadium and the like, while not absent from the point of view of ultimate analysis, were in such small quantity and varied in ways so entirely independent of the quality of the iron that the explanation could not be attributed to them.

In spite of the certainty in our own minds regarding conclusion 1, and the amount of qualitative confirmatory evidence we had on the subject from innumerable users, we felt that there might be some hesitation on the part of others in accepting it, and we accordingly decided to make a series of tests which should, if possible, be so conclusive as to admit of no dispute.

We took six irons constituting three pairs, the irons of each pair containing the same silicon (approximately), but having a different fracture and different strength, as shown by test bars cast from the furnace. The silicon of the three pairs was about 1.90, 1, and 0.70 per cent. We remelted these in twin crucibles, as will be described later, and cast test bars from the remelts.

In addition to the silicon we determined the graphitic and combined as well as the total carbon in each iron, both before and after remelting. We also made photomicrographs of the original pig and of a test bar from the remelt, both etched and unetched, for each of the six irons. These are shown in the accompanying illustrations, the magnification being 100 diameters. All of the specimens were taken from corresponding places in the pig or test bar, and are fairly representative of the structure as a whole.

Tests Outlined

To show quantitatively the relation between strength, combined carbon and graphite, we made combined carbon determinations, by difference in all cases, on the 1-inch bars, but the greater chilling of 1-inch bars in the medium No. 3 iron threw the combined carbon far beyond the eutectoid ratio, and we did not think this constituted a fair comparison. We, therefore, ran the combined carbon in all the 2-inch bars, taking the sample from the exact center of the broken face of the 2-inch bar, so as to make the results as nearly comparable as possible in each case. These results are shown in Table I.

In pair 1, silicon 1.90 per cent, the combined carbon in the strong iron was 0.65 per cent, and in the weak iron 0.78 per cent. The graphite in the strong iron was 3.40 per cent, in the weak iron 3.30 per cent.

In pair 2, 1 per cent silicon, the strong bar contained 0.96 per cent combined carbon, the weak iron 1.13 per cent. The graphite was exactly the same in both, 3 per cent.

In pair 3, 0.70 per cent silicon, the combined carbon in the strong iron was 1.20 per cent, in the weak iron 1.29 per cent. The graphite in the strong iron was 2.90 per cent, that in the weak iron 3.20 per cent.

In every one of these cases it will be seen that if we take account only of the quantity of combined carbon as increasing the strength of the matrix and that of graphite as reducing the same, we shall get results exactly opposite to the actual ones, except as regards the graphite in pair 3, and even here the difference in favor of the strong iron is slight. It may be that the matrix is somewhat stronger in the strong iron, but inspection of the three sets of photographs with an unprejudiced mind will force one to the conclusion that the principal reason for the difference is the shape and size of the graphite formed in the two cases, and that quantitatively this difference is ample to account for the difference in strength.

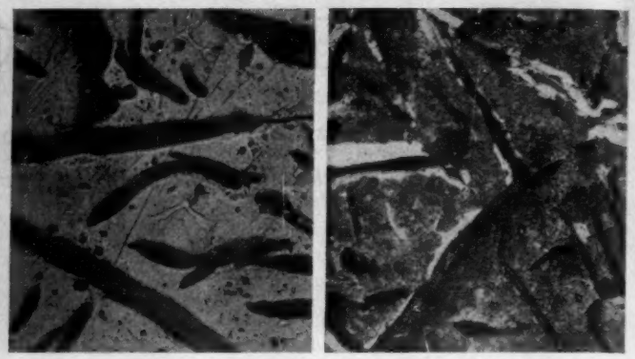
It seemed inconceivable that a quality which would survive remelting and superheating to a point well above the fusion point, as in foundry practice, should be a purely physical quality. In other words, if one iron were better than another because cast at a lower temperature, for instance, and for no other reason (both being identical in analysis); when both were remelted to the same temperature and recast under the same conditions, it is incredible that they would not lose the difference in quality due to this difference in original casting temperature. As the difference in quality evidently did persist in spite of remelting, it seemed to me necessary to believe that the difference was a chemical one.

As a consequence of this conclusion and of the establishment to our satisfaction of the second fact mentioned, that the less common elements were not responsible for these differences in quality in general (though undoubtedly they exert marked influence in special cases), it seemed inevitable that some of the common elements, not ordinarily determined, must be accountable for these variations in quality. Of these, the most universally present in the blast furnace, oxygen, nitrogen and hydrogen, are the most common and seemed a likely field for investigation.

In regard to hydrogen, it was a very simple matter to test for its presence in the form of water vapor in the current of oxygen passing through the combustion furnace in carbon determinations, and accordingly precautions were taken to see if any water

[1]Presented at the meeting of the American Institute of Mining Engineers, held at New York City, Feb. 18.

FIGS. 1 AND 2—UNETCHED AND ETCHED, ORIGINAL GOOD IRON, OXYGEN 0.027 PER CENT, SILICON 1.90 PER CENT



FIGS. 3 AND 4—UNETCHED AND ETCHED, ORIGINAL POOR IRON, OXYGEN 0.009 PER CENT, SILICON 1.88 PER CENT

vapor could be detected in the oxygen current, but with an absolutely negative result. This, of course, was not surprising in view of the small quantity of hydrogen in the hearth of the furnace compared with the quantity of nitrogen and oxygen present, and in view of the results of recent investigations along this line. All of the latter prove that while hydrogen is absorbed by iron with avidity at low temperatures, it is all driven off on raising the temperature to a point much below that of the blast furnace.

Some metallurgists have taken the view that it was impossible for oxygen to exist in the presence of so highly carbonized a product as cast iron, and at so high a temperature as that of the blast furnace, but about 10 years ago I had made certain observations which seemed to me to indicate strongly the presence of oxygen in cast iron, and I did all that I could to get the matter investigated then by those competent to do the work.

The furnaces of the Longdale Iron Co., in whose employ I was at that time, ran continuously for many years on basic iron, with an absolutely constant ore mixture and with a blast temperature which was, to all intents and purposes, unvarying from one year's end to another, 850 degrees Fahr. Careful and long continued observation of the appearance of the iron, and particularly of the small sample chill pig made at each cast, in conjunction with the analysis, taken with the working of the furnace itself and the character of the running iron, brought out clearly certain conditions which prevail to a certain extent at all plants, but not so conspicuously at those with less constant conditions.

Marked differences in the fracture of the iron for a given analysis were observable according to whether the iron was "wild" on irregular furnace conditions, or whether the operation was normal and the iron "quiet."

On white irons, in good normal working condition of the furnace, the fracture of the chill pig was practically square, with clearly marked acicular crystals running perpendicularly from the chilled surfaces of the pig, even from the top in some cases, and clearly showing lines running from the center to the corners, these lines being where the sets of crystals from adjacent sides met.

On a "wild" iron of similar analysis the fracture was smooth, but conchoidal rather than square, with a complete absence of crystals radiating from the sides of the pig, and, of course, a corresponding absence of the interference lines of these adjacent sets of crystals running to the corners.

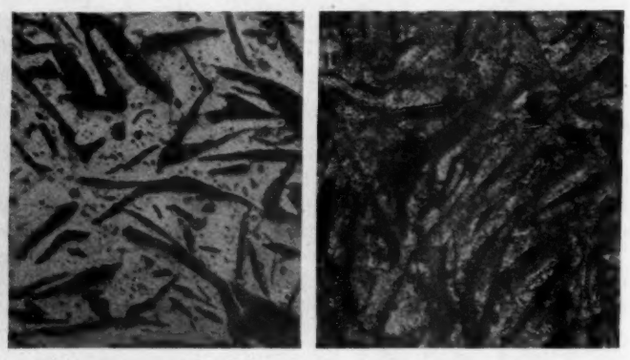
Irons with higher silicon when made on a smoothly running furnace had a comparatively slight chill. Such as there was showed strongly marked acicular crystals similar to those in the white iron, the grain quite open and the color light. When made on a wild-working furnace, iron with approximately the same silicon had greater chill with absence of crystals, while the gray portion was exceedingly fine grained, and dark, almost purplish in color, so as to give it a velvety appearance.

In coke practice a wild-working furnace is almost always associated with higher sulphurs, and the irons last described, both white and gray, came to be cordially detested as showing, even in advance of analysis, high sulphur.

It is a matter of much interest to observe that the white irons showed in an increasing degree, as they became wilder, cleavage surfaces which were discolored with the blue, red and purple "oxide colors". This was commonly attributed to oxidation by the absorption of air into cooling cracks in the pig, but I have seen many cases when these surfaces could only be broken apart by the most tremendous sledging, and this never seemed to me to correspond with the idea of a crack of sufficient width to permit the ingress of air.

These "wild" irons, particularly the harder ones, as they cooled, threw

FIGS. 5 AND 6—GOOD IRON REMELTED, UNETCHED AND ETCHED, SILICON 1.90 PER CENT



FIGS. 7 AND 8—POOR IRON REMELTED, UNETCHED AND ETCHED, SILICON 1.88 PER CENT

FIGS. 9 AND 10—ORIGINAL GOOD IRON, UNETCHED AND ETCHED, OXYGEN, 0.038 PER CENT, SILICON 1.05 PER CENT

FIGS. 11 AND 12—ORIGINAL POOR IRON, UNETCHED AND ETCHED, OXYGEN 0.009 PER CENT, SILICON 1.00 PER CENT

off a scale of considerable thickness, continuous at first and detaching itself from the surface of the pig in slabs frequently as large as one's hand. Thinking that this scale might be an indication of something, I had it analyzed for sulphur, with the surprising result of finding only about one-third as much sulphur in the scale as was in the iron.

Oxygen in Charcoal Irons

When I first began making charcoal iron, the founder told me of "special cylinder" iron, which he described as "an iron with a No. 2 analysis and a No. 3 fracture, made when the furnace was coming up out of a scrape". I asked to be shown a specimen of this iron, and being struck by its absolute similarity of appearance to the "wild" gray iron made on a coke furnace under similar conditions, I was at once convinced that it contained oxygen and that the notion of its superiority to ordinary iron was an erroneous one; and I condemned it without qualification.

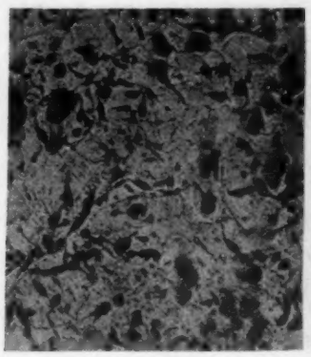
I was strongly of the opinion then that the more easily reducible the ore the better would be the iron, because the more thoroughly deoxidized it would be. This was very strongly the opinion of William Wilkins, general superintendent, and he accordingly bought some Mesabi ore of first-class physical structure, containing about 7 per cent of combined water; in other words, a fine limonite; and we made a test with this ore, substituting it for our regular Gogebic hematite, a little at a time.

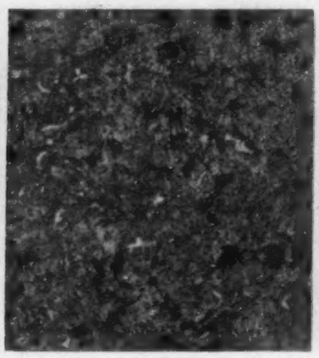
We had by that time instituted the making of test bars from every cast and could observe directly the variations in the strength produced by different conditions. We found that the strength of the iron fell steadily as the percentages of Mesabi increased, so that it dropped from 2,800 or 2,900 pounds on a 1.25-inch test bar to about 2,400 pounds when we had on from 75 to 80 per cent of the fine limonite. We then took off the Mesabi, got the furnace back on to an all soft-hematite burden and repeated the experiment, with absolutely identical results.

About that time my attention was called to coke irons made on an all-limonite burden, which were of beautiful analysis, soft, open-grained and exceedingly weak. It then occurred to me that we had disliked the "wild" coke irons because they were generally associated with high sulphur, without regard to their physical characteristics, and, on thinking it over, I realized that they were not infrequently exceedingly strong, tough irons; and finally it seemed to me likely that by reversing my former opinion absolutely we might perhaps get a theory which would conform more closely to the facts, and that it might be the presence of a certain amount of oxygen (in what form I do not pretend to say) that produced certain characteristics as to fineness of grain, chilling qualities, strength and toughness, which are so much desired. It is now more than two years ago that I began to work on this hypothesis with all the means at my command.

Spongy No. 6

I have previously mentioned a product virtually unknown at coke furnaces, which we call spongy No. 6. This is an iron made on an exceedingly cold furnace, perfectly white, and filled with a mass of blow-holes so great as to occupy up to a half or even more of the volume of the metal. The walls of these blow-holes are as white as silver. The cause evidently is the descent into the hearth of a mass of incompletely reduced iron, which, mixing with the liquid iron already present, sets up an action almost like that in an open-hearth furnace. The silicon is removed down to the barest trace, 0.03 per cent or so, and the carbon is then attacked and oxidized from the normal 3.50 to 4.00 per cent down nearly to 3.00 per cent in some cases. The iron, being very cold and low in carbon, is naturally very pasty and chills

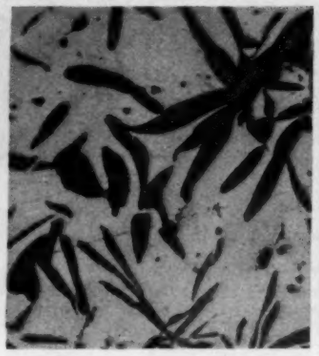




FIGS. 13 AND 14—GOOD IRON REMELTED, UNETCHED AND ETCHED, SILICON 1.05 PER CENT

FIGS. 15 AND 16—POOR IRON REMELTED, UNETCHED AND ETCHED, SILICON 1.00 PER CENT

FIGS. 17 AND 18—ORIGINAL GOOD IRON, UNETCHED AND ETCHED, OXYGEN 0.065 PER CENT, SILICON 0.70 PER CENT



FIGS. 19 AND 20—ORIGINAL POOR IRON, UNETCHED AND ETCHED, OXYGEN 0.009 PER CENT, SILICON 0.72 PER CENT

without giving a chance for the escape of the CO formed by the oxidation of the carbon.

It was evident that this iron must contain a great quantity of oxygen, and that if this were really the cause of strength and the other desired qualities in iron it could be secured by making a mixture of this spongy No. 6 and a normal iron. Such a mixture was accordingly melted in the crucible, and test bars made therefrom showed results as strong or stronger than the best iron ever made from the furnace; 1.25-inch round bars on 12-inch centers breaking up nearly to 5,000 pounds as against an average of about 3,000 pounds for normal irons.

Producing Special Iron at Will

It then seemed that we had only to introduce oxygen into the hearth of the furnace to make an iron as good as the best. The easiest way to do this seemed to be to cause irregular working of the furnace and this we proceeded to try out by purposely distorting the filling for several hours. We undoubtedly upset the regular running of the furnace, but the iron was no better, probably somewhat worse than before. We then put a medicine valve on the bustle pipe, filled it with mill scale and blew it into the hearth just before cast time, with little or no result, and such as there was, a detriment to the quality. This was repeated several times.

We then began ladle experiments, heating iron ore and other kinds of oxides in the bottom of a ladle before cast time and running iron in on them at cast, stirring up the mixture and pouring test bars and sample pigs. By this means we did close up the grain of the iron and induced a paper chill (that is, a line of white no thicker than a piece of paper around the edge of the pig), which was not present in the regular cast, but when it came to improvement in strength and toughness there was little or none to be observed.

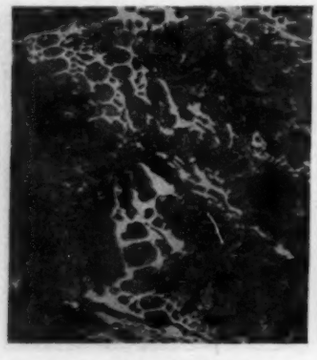
During the early part of this investigation descriptions of the Ledebur apparatus for the determination of oxygen in iron and steel as modified by the chemists of the American Rolling Mill Co. were published, and we bought a set of this apparatus and began direct determination of oxygen. This determination in the presence of 3 or 4 per cent of carbon is a very different matter from its determination in steel, and it took some time to learn all the precautions necessary to secure low blanks and concordant results.

This end, however, was attained in time. We first made a determination of oxygen in some spongy No. 6 and found it to contain as high as 0.13 per cent. We then took cold-blast irons and special cylinder irons and found these to range as high as 0.07 per cent. We then took normal charcoal irons and found them to contain only about 0.015 per cent; foundry coke irons and electric-furnace irons contained none at all. We were unable to secure samples of "wild" coke basic iron such as described.

Method of Making Remelts

As many of the data in this article are derived from tests of remelts, it seems desirable to state that all the remelts mentioned or tabulated in this paper are made in a "coke hole", approximately elliptical in shape so as to take two crucibles at once, and provided with two tuyeres at opposite ends of its long diameter, so that both its crucibles would be subjected to the same intensity of combustion, etc. In all cases where directly comparative results of a given treatment have been sought, iron from the same cast has been used in each crucible, melted at the same time, and the two poured within a few minutes of each other; one with, the other without the desired treatment. We have endeavored to get two 2-inch square bars, two 1-inch square bars, and two 1.25-inch round bars, all cast on end, from every such heat, but not having a skilled molder on this rather difficult work, we have not always succeeded

(*Continued on page* 388)



FIGS. 21 AND 22—GOOD IRON REMELTED, UNETCHED AND ETCHED, SILICON 0.70 PER CENT

FIGS. 23 AND 24—POOR IRON REMELTED, UNETCHED AND ETCHED, SILICON, 0.72 PER CENT

IRON AND STEEL MARKETS

February Keeping Ahead of January Record

And Steel Corporation Bookings Show Good Gain Over Last Month—
Active Buying of Basic in East—Large Companies Buy Foundry Irons

BY GEORGE SMART

February business is making a good showing in spite of the decrease in buying of pig iron and finished materials reported by many companies, as noted last week. New business of the Steel Corporation this month has averaged more than 50,000 tons daily, or 10,000 tons daily more than the January average. The Corporation is operating 80 per cent of its ingot capacity and is gradually increasing its pig iron production, adding four furnaces to the active list this week. An exceptionally good showing is being made in steel tubes. The bookings of the National Tube Co. for the first half of this month are heavier than those for the same period in January, which was the best month since last August.

Coke

The coke market is displaying greater strength. Several tonnages of furnace grades have been sold at more than $2, ovens, and no standard furnace coke is being offered for second quarter at less than that figure, while quotations as high as $2.20 are reported. There is not much activity in foundry coke.

Pig Iron

In steel-making pig irons, the principal activity of the past week has been in basic in eastern territory, where the total sales of the recent movement amounted to about 35,000 tons, a large part of which was taken at advanced prices. A Harrisburg company divided 14,000 tons of basic at $14.25, delivered, between two makers. Another eastern buyer took 10,000 tons for delivery over the next few months. A Harrisburg buyer is still inquiring for 4,000 to 6,000 tons of basic. The Republic Iron & Steel Co. purchased 15,000 tons of Bessemer from the Brier Hill Steel Co. at $14.25, valley. In foundry grades, the purchase of 10,000 tons by the Westinghouse Electric & Mfg. Co. has aroused much interest. A significant feature was that although the inquiry called for second, third and fourth quarter delivery, furnaces declined to sell for delivery beyond July 1 at prices satisfactory to the buyer. The 10,000 tons will be delivered before July 1. Of this tonnage 6,000 tons, it is understood, will be furnished by Cleveland furnaces on a basis of about $13.50, delivered, to the Cleveland plant, for No. 2 foundry, and 4,000 tons will be delivered to the Allegheny plant at $14 to $14.75, delivered. Some foundry iron has been sold within a few days at $13.50, valley, for No. 2. The International Steam Pump Co. has distributed from 10,000 to 12,000 tons of various grades, of which a considerable tonnage will come from Buffalo furnaces.

Plates and Shapes

Independent oil companies have ordered four tank steamers, which, it is understood, will be built at eastern yards. The Maryland Steel Co. has received the award for two government colliers and it is understood to have placed 8,000 tons of plates with an eastern mill. The Southern railroad has received bids on 3,100 tons of plates, 1,200 tons of shapes and 500 tons of bars for car construction in its own shops. The contract for the third tracking of three elevated railroad lines in Manhattan and the Bronx, calling for fully 50,000 tons of steel, has been awarded by the Interborough Rapid Transit Co. to three general contractors.

Railroad Buying

The postponement of the time for the decision of the question of granting higher rates to the railroads is not disappointing to those who have realized for several weeks that it would not be possible for the Interstate Commerce Commission to finish its investigation by March 1. Nevertheless, the postponement has emphasized the fact that the railroads cannot be depended upon to add greatly to the volume of business this spring or summer. Probably for prudential reasons, efforts are being made to prevent publicity concerning some railroad buying which has been done recently. Two orders for 1,500 cars each have been placed with western makers. The Illinois Central has placed 17,500 tons of rails with the Tennessee company, which has also taken 6,000 tons from the St. Louis & San Francisco. Additional rail bookings by the Illinois Steel Co. amounted to 14,000 tons. Chicago mills have booked about 50,000 tons of car material for cars recently ordered. The American Car & Foundry Co. ordered 40,000 tons.

Coke Market Strong at Pittsburgh

Sales of Furnace Grades Made at Advanced Prices—Heavy Melting Steel Sells at $13

BY C. F. WILLIAMS

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.,
Pittsburgh, Feb. 17.

Improvement reflected by the iron and steel market since the opening of the year has not been so pronounced this week as it was seven days or two weeks ago, indicating, as previously asserted, that market conditions are not expected to reach a boom stage for at least some time. Although new buying has not equalled the rate prevailing a few weeks ago, which might easily be expected, specifications have come out in fairly good volume, and consumers appear more concerned about shipments than previously. Demand for second and third quarter material has increased and prices show greater resistance than 10 days ago, although concessions have not entirely disappeared. The pig iron market, after two weeks of heavy buying, has settled down considerably, but the coke market is beginning to reflect activity, and $2.10, ovens, has been paid for a heavy tonnage of second quarter blast furnace fuel. Heavy melting steel has advanced to $13, and other grades of scrap are correspondingly strong.

Pig Iron

Sales have not been frequent this week, and tonnages involved have not been heavy, but prices are slightly higher and firmer than a week ago. The Republic Iron & Steel Co. has taken 15,000 tons of Bessemer from the Brier Hill Steel Co., at $14.25, valley, which easily establishes the Bessemer market at that figure as a minimum, with some dealers refusing to shade $14.50. The Westinghouse Electric & Mfg. Co., last Friday, closed for 10,000 tons of Nos. 1, 2 and 3 foundry grades for second quarter shipment to plants at Cleveland and Allegheny; the former plant took 6,000 tons at about $13.50, delivered, and the latter works, 4,000 tons at about $14 and $14.15, delivered, for No. 2. The bulk of the iron will be shipped from nearby points. Original inquiries called for second, third and fourth quarter delivery, but dealers refused to sell second half iron at prices attractive at this time. Several fairly heavy lots of foundry and malleable have been sold at $13.50, valley, and some dealers are refusing to shade that figure. There is not the buzz of excitement to the basic market that there was a week ago, but prices are less irregular.

Ferro-Alloys

The market is quiet, after the flurry of a fortnight ago, but there still is some uncertainty about prices. Some dealers are holding ferro-manganese at $40, seaboard, but material was offered at $38 the latter part of last week, although that figure has been withdrawn.

Sheets and Tin Plate

Pressure for second quarter sheets is heavier, but leading manufacturers have thus far refused to open books for shipment after April 1, and some mills are declining to sell for any delivery. It is probable that second quarter policies will be announced within a week. Mills are operating at about maximum capacity. Specifications for tin plate have been heavy, and mills are running full.

Plates and Shapes

Further suspension of freight rate tariffs of eastern railroads naming 5 per cent advances does not help the situation so far as railway buying is concerned, although some contend railways now will have to cover immediate needs without increased revenue from this particular source. Plates and shapes are being held at 1.25c by some makers, but 1.20c continues to be done for prompt delivery, and 1.15c plate prices are reported in isolated cases. Plates, apparently, are weaker than shapes or steel bars.

Rails and Track Material

Deferred rail buying has caused this particular department of the market to drag, but there is no reason to believe that railroads will not cover requirements in the near future. Spikes are being held at $1.50, and the 1.45c quotation has practically disappeared.

Semi-Finished

Twenty-two dollars, mill, apparently is the minimum of the market for sheet bars, and makers do not appear anxious to sell at that figure. Some material has been offered at $23, mill, for second quarter delivery. Billets are firm at $21, mill. Wire rods are being held at $27, Pittsburgh, by some makers. Muck bar is stronger than a week ago.

Bolts, Nuts and Rivets

Several manufacturers have advanced quotations, but prices have not yet become uniform, there still being considerable irregularity. Specifying has been heavier.

Bars, Hoops Bands and Shafting

Steel bars are being held at 1.25c for second quarter, but prompt tonnage is selling at 1.20c in many instances. Iron bars have been advanced by some makers, but minimum prices have not disappeared. Hoops and bands are unchanged. Following the lead of the Columbia Steel & Shafting Co., several other makers have withdrawn prices below 63 off list for shafting.

Tubular Goods

The Columbus Gas & Fuel Co., Columbus, O., has not yet closed for 122 miles of 16-inch and 55 miles of 12-inch, and an inquiry for about 200 miles of oil country goods from an Indianapolis concern is before the trade. Demand for boiler tubes is not yet normal, but the market in other respects is regarded as satisfactory.

Wire Products

Specifications continue to come out liberally, and mills have enough tonnage on their books to assure the continuation of present operating schedules for a couple of months. New buying is light, and no improvement is expected until consumers have specified fully against contracts placed some time ago.

Coke

The coke market reflects strength. A couple of fairly heavy tonnages of furnace coke have been sold this week at $2.10, ovens, and above, and no strings are attached to the fuel involved. Consumers, who paid $2, ovens, or a trifle less for first quarter requirements, advise that strictly standard coke is being held at $2.10, $2.15 and $2.20, ovens. Prompt furnace coke is selling as low as $1.85, ovens. Foundry coke is being held at $2.75, ovens, by some sellers. The Connellsville Courier, for the week ending Feb. 7, says production was 304,975 tons, compared with 301,055 tons for the week before.

Old Material

At least two blocks of heavy melting steel have been sold at $13, delivered, and several dealers are refusing to shade that figure. Other grades have recorded advances during the week, but it is not believed the market will continue to improve at the rate which has prevailed for several weeks.

Chicago Mills in Comfortable Position

And Not Anxious to Take on More Business—Buyers Await Developments Before Placing More Orders

BY G. H. MANLOVE

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, Feb. 17.

A breathing space has appeared in the iron and steel market while sellers and buyers are apparently taking stock of the situation before committing themselves further. Mills now have sufficient tonnage to feel justified in refusing to take on more at present prices. Buyers are well covered and awaiting developments before contracting further. Prices are holding firm at the present level and fewer indications of shading are seen. Some enlargements of operation have taken place the past week and here and there a mill reports almost normal conditions of operation. Rails and track fastenings continue to lag behind and are the weakest point in the entire market. Plates show less strength than other finished steel products while sheets and wire are active and strong.

Pig Iron

Quieter conditions rule in the pig iron market on both northern and southern after the recent heavy selling movement. Northern iron appears firmer at $14.25, Chicago furnace, and comparatively little tonnage is obtainable at $14, Chicago furnace. Melters are well covered and makers are not anxious to take on more tonnage except for immediate delivery. Inquiry continues for third quarter and last half and some sales have been made over third quarter at $15, Chicago furnaces, for No. 2 foundry. No sales have been made over the full year as far as can be learned. Most makers prefer to delay contracting beyond the middle of the year until the situation has clarified.

Southern iron is holding generally at $11, Birmingham, and tonnages at $10.75, Birmingham, appear nearly gone. Recent offers by brokers under $11, Birmingham, have been refused. Some southern brands are being held at $11.50, Birmingham.

While most of the inquiry is for small tonnages a few of larger size aren pending. Parlin & Orendorff, Canton, Ill., are in the market for their requirements of malleable iron for the remainder of the year, estimated at 3,000 to 5,000 tons. Campbell, Wyant & Cannon, Muskegon, Mich., have closed for 2,000 tons of foundry and high silicon iron for delivery through August. Half of this tonnage went to a southern maker. A Wisconsin melter has bought a small tonnage of 3.1 per cent silicon iron for delivery over the next two months at $16, delivered, or $15, Wisconsin furnace. A recent sale of malleable was on a basis of $13, Ironton.

Merchant Bars

With the mills better filled with tonnage, the advance of $1 per ton on steel bars by the leading interest appears to be followed generally by independent makers. One interest which has not contracted for forward delivery is still selling at 1.20c, Pittsburgh, but will not take forward orders on that basis. It is probable attractive tonnages could be placed at the former quotation of 1.20c, but the mills are holding stiffly for the new price. The quotation of 1.30c, Pittsburgh, for second quarter business continues, but contracting at that level is not heavy.

Plates and Structurals

Plates continue to be somewhat weaker than other finished steel products, but mills have contracted for fair tonnages and the advance of $1 per ton announced last week is being maintained better than had been expected. Some car buying has appeared, but it is being done quietly and is not up to the usual volume in this territory. This has the effect of giving the minimum quotation on plates more vogue. Structural steel is stronger with 1.25c, Pittsburgh, as the maximum, some business being taken still at $1 less for prompt delivery.

Sheets

Sheets continue to be firm with some local makers holding closely to 2c, Pittsburgh, for No. 28 gage black and 3c for No. 28 gage galvanized. While $1 per ton less still may be done, the minimum is becoming rarer.

Rail and Track Fastenings

Standard steel rails have failed to gain strength. Orders continue slack and specifications are not sufficient to give the market strength. Spikes and other fastenings are generally weak, but orders have been booked sufficient to make 1.55c represent the market fairly.

Wire Products

Business in wire and wire products continues at the same rate which characterized January and the mills are accumulating considerable tonnage. The quotation of 1.60c for nails appears stronger than a week ago and contracts at $1 per ton less are becoming scarcer. Business in wire continues to go at 1.35c to 1.40c, with the maximum quotation stronger.

Cast Iron Pipe

Lettings in the cast iron pipe market the past week have been practically nothing. Prospective business is not strong, but prices have not weakened. Kansas City, Mo., will let a contract for 725 tons this week and Akron, O., is to let a contract for 2,600 tons.

Bolts, Nuts and Rivets

Firmness continues lacking in this department, as orders have not appeared in sufficient volume to meet the needs of the mills. Prices remain 1.78c, Chicago, with shading here and there.

Old Material

Following the decided advances of several weeks past, the scrap market appears to have reached a level where further advance is checked. Both dealers and melters have large stocks and a recession in demand at present prices has caused a halt. Some slight changes have been made in scrap schedules to equalize prices, but no general advance has been registered. In some quarters, it is expected a decline in prices may be made shortly. Several railroad lists have been submitted in the past week. The Santa Fe road offers about 3,900 tons, which includes 1,000 tons of No. 1 railroad wrought. The C., P. & St. L. offers about 800 tons, which includes about 400 tons of long and short rails. The Mobile & Ohio road offers 175 tons and the Minneapolis, St. Paul & Sault Ste. Marie a small list.

Announcement is made by H. L. McClaren, president of the Mitchell-Lewis Motor Co., Racine, Wis., that the concern's wagon plant has been sold. This releases about $2,000,000 which will be used in financing additional motor manufacturing facilities.

Men employed by the Apollo Steel Co., Apollo, Pa., which recently completed a new sheet mill, have returned to work after a brief strike. There was a disagreement over the wage scale.

Westinghouse Buys Ten Thousand Tons

Of Which 6,000 is for Cleveland Plant—Pig Iron Prices Firmer in Cleveland District

BY GEORGE SMART

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, Feb. 17.

Iron Ore

The movement of ore from dock to furnace is proceeding at a somewhat better pace at present, though the total is not equal to that of last year. However, the docks are likely to be reasonably clean when navigation opens, as it is not expected that any ore will reach Lake Erie ports during April. With leading men of lake interests away on their vacations, there is obviously no talk as yet of 1914 prices. Every one expects the situation to improve within the next month or two, and there is consequently nothing to be gained by forcing the issue now.

Pig Iron

Interest has centered during the past few days in the purchase of 10,000 tons of Nos. 1, 2 and 3 foundry grades by the Westinghouse Electric & Mfg. Co., for shipment prior to July 1. Of the 10,000 tons, 6,000 tons are for the Cleveland plant and it is understood that this iron was sold by Cleveland interests on a basis of $13.50, delivered, for No. 2. Since this iron was sold, the Cleveland market has exhibited increased firmness and the Cleveland Furnace Co. has advanced its quotation to $14, delivered, for No. 2 for Cleveland delivery during the first half of the year. For delivery outside of the city, $13.50, furnace, is the prevailing quotation. It is understood that Corrigan, McKinney & Co. are as firm in their views on prices as is the Cleveland Furnace Co. In spite of the comparative quiet of the market and the refusal of Cleveland agencies to accept certain offers of round tonnages, sales this month make a very fair total. One Cleveland firm has sold over 30,000 tons this month.

Finished Material

Steady progress in establishing recent price advances is being made and it is increasingly difficult for buyers to shade the 1.25c, Pittsburgh, quotation on plates, shapes and bars. Plates have been considered the weakest of these three leading products, but it is doubtful whether less than 1.25c could be done except on a very desirable tonnage. Sheet manufacturers are showing unusual unanimity in adhering to quotations. Nut and bolt business is in a much more satisfactory condition from the standpoint of the manufacturer. Bar iron business is dull and prices low in competitive territory. The increasing popularity of steel bars with the railroads is having a depressing effect on the bar iron market. Warehouse business shows some improvement, but there is still plenty of room for improvement, as this branch of the business has been extremely dull.

Coke

Furnace grades are showing greater firmness and $2 is apparently rock bottom on contracts. There is very little activity in either furnace or foundry grades in this section.

Old Material

The scrap market is quiet but firm. A good tonnage was booked by mill buyers during the past week, but demand has grown less active. A large consumer of heavy melting steel is still in the market for several thousand tons, offering [illegible] brokers will not sell at this price. Sales were recorded recently at $12.25 to $12.50 and higher. We continue to quote $11.50 to $12. Sentiment among dealers is cheerful.

MALLEABLE LEADS

In Buying at Buffalo—Scrap Market More Active.

BY FRANK R. DOLBEE

Office of THE IRON TRADE REVIEW,
Buffalo, Feb. 17.

Malleable iron led the sales of the week, which totaled between 20,000 and 25,000 tons of all grades. There are a few orders for 1,000 to 2,000-ton lots, but the week's total is made up largely of orders for iron in carloads and small lots up to several hundred tons. The producers have apparently ceased to make particular effort to book sales. This attitude has caused a disappearance of concession prices. A sale of 2,000 tons of gray forge iron at $12.50 is reported, but the selling interests say that this price is no longer obtainable. The market minimum on foundry grades at this time is $13 for first half delivery. On iron wanted for delivery over third quarter and second half the producers are asking an advance of $1 per ton over the current quotations.

Finished Material

Buying is not so active as it has been for the past few weeks, but specifying continues to keep up, representing a considerable demand upon the mills for early requirements. The recent advances in prices to a general schedule of 1.25c base, for shapes, plates and bars, are being firmly maintained. There has developed a fair volume of buying in small lots for nearby needs. The principal demand is for reinforcing bars. Numerous inquiries are coming in for track supplies, spikes, etc.

Reports from Canada indicate an improvement in the market there which experienced a lull dating back to the beginning of the second half of last year. Improvement in the money market, due to the easing up of the foreign situation, has caused a revival of activity there, and the reported placement of a large tonnage of structural steel for a number of operations.

Old Material

The scrap market shows a greater degree of activity than was noted a week ago, with a stiffening of prices on a number of lines. There continues to be a good demand for heavy melting steel at the prices quoted a week ago. The improvement in the market is particularly noticeable in the demand for machine shop turnings, which have advanced to $6.50 to $7 per ton. Clean cast borings have also advanced 25 cents per ton and represent one of the active items.

Increased consumption in the past two months is said to be responsible for the rise in the price of borings and turnings, particularly when it is considered that the shops depended upon to produce these lines are working at less than normal capacity.

The Otis Elevator Co., which recently erected a new foundry in Buffalo to take the place of the old one in Chicago, has begun operations in the new plant. Gray iron heats are now being taken off and the steel department will begin to produce in a week or 10 days.

The sixth annual meeting of the American Institute of Chemical Engineers will be held at Troy, N. Y., June 17-20.

Aggregate Tonnage at Cincinnati Large

In Pig Iron Sales Made Up of Largely Small Tonnages—Southern Prices Tending Upward

BY S. G. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, Feb. 17.

Pig Iron

Sales made during the past week have been mostly for small lots, but the aggregate tonnage is large. General inquiries are scarce and the majority of business is being secured by solicitation. Northern iron is still in better demand than southern especially in certain parts of this territory, where the freight rates on southern iron are in excess proportionately to the differential that usually exists between these two grades. More basic iron has been bought than any other grade by melters in this district since the first of the year, the aggregate purchases of the Andrews Steel Co., the Portsmouth Steel Co. and the American Rolling Mill Co. alone being approximately 75,000 tons.

A sale of 600 tons of 8 per cent silicon iron has been made to a southern Ohio melter for last half delivery at $16, furnace, or $17.20, Cincinnati. Other recent sales include 1,500 tons and 500 tons of charcoal iron to Michigan melters and 1,000 tons to a gas engine manufacturer in Evansville, Ind., most of which will be northern iron. The inquiry at Marion, Ind., for 1,000 tons of northern and 1,000 tons of southern iron is still pending, as is also one for 700 tons of analysis iron from Louisville, Ky.

Southern prices are showing a tendency to advance, and $10.50, Birmingham basis, for No. 2 foundry iron can now be done only east of the dividing line of Ohio and Indiana, where certain furnaces have a large differential. The minimum price throughout the general Cincinnati territory is $10.75, Birmingham, with $11, Birmingham, the most frequent quotation. Three southern makers have advanced to $11.25 and $11.50, Birmingham, for No. 2 foundry for the second quarter. Southern Ohio prices are unchanged but firm at $13, Ironton, for No. 2 foundry for either prompt or first half shipment.

Coke

Foundry coke is a little more active and a slight demand is evident from all parts of this territory. Heavy buying, however, is not expected until foundries begin to close for second half requirements, as practically all have covered until next July. Very little business is reported on furnace coke. Requisitions to forward shipments on old contracts are better than at any time during the past six or seven months, which indicates that considerable pig iron is being melted. Pocahontas furnace coke is quoted a little in advance of last week's quotations, being now from $2.15 to $2.40 for prompt shipment, and from $2.25 to $2.60 for contract shipment. Wise county and New River prices are unchanged. The majority of operators in the Connellsville district have advanced slightly above last week's quotations, but it is reported that one or two producers in that district are still offering at the lower figures that prevailed last week.

Finished Materials

Mill prices on sheets are very strong and mills in this territory are taking orders only for nearby shipment except in special cases. Specifications are reported very good. Black sheets No. 28 gage are quoted at from 2.15c to 2.20c, Cincinnati, galvanized sheets No. 28 gage at from 3.15c to 3.20c, Cincinnati, and blue annealed sheets No. 10 gage at from 1.60c to 1.65c, Cincinnati. Steel billets are quoted at $21, Pittsburgh, and wire rods at $26.50, Pittsburgh, by makers in this territory. Sheared plates are being held firmly at 1.40c, Cincinnati. The general report is that business done thus far in February is better than last month. Demand for sheets in some cases is coming from abnormal territory.

The present cold weather has not had any noticeable effect upon warehouse business, which is better than at any time during January. Prices are unchanged and an advance is not expected before several weeks. Steel bars are quoted at 1.75c to 1.90c, iron bars at 1.70c to 1.80c and plates and shapes at from 1.85c to 2c, f. o. b. Cincinnati. All forms of cold rolled shafting are quoted at from 55 to 58 off.

Old Material

The market has not gained any in strength during the past week, and in some instances it is reported a little weaker. This is attributed to the fact that it has been mostly a dealers' market since the first of the year, and that recent advances in price have been brought about more by speculation and an optimistic feeling among dealers rather than by a good buying movement. Some of the larger users of scrap in this territory have covered for the next few months' requirements, and local foundries show no inclination of increasing operations at the present time. Prices are unchanged, and the tendency towards a higher level is not as much in evidence as it was last week. Small sales of bundled sheet scrap and machine shop turnings are reported made by dealers at $5.25 and $5 per net ton, respectively.

FEW SALES

Of Pig Iron at St. Louis and Little Inquiry Pending.

BY E. C. ERWIN

Office of THE IRON TRADE REVIEW,
St. Louis, Feb. 17.

Sales of pig iron in the St. Louis territory last week were confined to small tonnages, and today there is scarcely an inquiry in sight. Some sales agents are insisting that $11.50, Birmingham, is the best that could be done for southern No. 2, while others admit that business is so dull that $11 could easily be obtained, and something better might be done. Northern iron is quoted at $13.50 to $14, Ironton, and $14 to $14.50, Chicago.

There is no activity in coke. Connellsville 72-hour foundry grades are held at $2.75, and Virginia 72-hour foundry at $2.65, f. o. b. ovens, in both cases.

Old material prices are strong and unchanged, and while very few transactions are reported, dealers are optimistic about business conditions.

Electrical Engineers' Banquet

The Pittsburgh section of the American Institute of Electrical Engineers held its eighth annual banquet last week at the Fort Pitt hotel, Pittsburgh. The following talks were given: "The Institute", C. O. Mailloux, of New York, president of the society; "Rates", Paul M. Lincoln, Westinghouse Electric & Mfg. Co., Pittsburgh; "The Making of an Engineer", Dr. William M. Davidson, superintendent of Pittsburgh public schools; "Stomatology", George P. Early, American Sheet & Tin Plate Co., Pittsburgh.

Basic Pig Shows Activity in the East

Considerable Tonnage Sold at Higher Prices— Specifications of Finished Materials Are Liberal

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
326 Real Estate Trust Bldg.,
Philadelphia, Feb. 17.

New buying of finished steel products in the eastern Pennsylvania district is quieter, but specifications are good and mill operations are holding their recent expansion. Prices, in general, are unchanged and concessions still occasionally appear under the most favorable buying conditions. Basic pig iron has been in active demand and total sales of the past two weeks now reach about 35,000 tons, considerable of which was done at the advanced level of $14.25, delivered. Other iron grades are in less demand. Old material maintains its strong undertone and some grades have further advanced.

Pig Iron

Active buying of basic iron the past week by eastern steel makers in addition to that reported a month ago, has brought the total recent movement of this grade up to about 35,000 tons. A considerable part of this tonnage, especially that for forward delivery, was booked at $14.25, delivered, the same advanced price announced as having been done a week ago, though for early shipment some tonnage was accepted at $14, delivered. The Central Iron & Steel Co., Harrisburg, divided between two makers 14,000 tons of basic for second quarter at $14.25, delivered. Another buyer took about 10,000 for delivery over the next few months, part of which was the result of a trade deal. A Philadelphia steel maker took 1,000 tons and a Trenton consumer 2,000 tons for early shipment in addition to the round lot reported last week. A Harrisburg buyer still is inquiring for 4,000 to 6,000 tons. Some basic makers now have withdrawn from the market; others are naming $14.50, delivered, as their minimum. Foundry irons have been less active. Prices remain $14.75 to $15.25, Philadelphia, for No. 2X. The Pennsylvania railroad inquiry for 3,700 to 7,400 tons still is pending. The Southern railroad has increased its recent inquiry to 1,350 tons. Virginia irons show slight stiffening, but $12.50, furnace, for No. 2 plain and $12.75 for No. 2X are available for early delivery as for the remainder of the first half. Recent sales of standard forge iron to an eastern Pennsylvania rolling mill, it develops, were done at $13.90, delivered. One eastern Pennsylvania pipe maker bought a block of low grade iron for a nearby furnace at $13.75, delivered. Another eastern pipe shop took 2,000 tons of forge and No. 3 at $14.25, delivered, while a third consumer of this class closed for a fair tonnage. Considerable tonnage of Lebanon low phosphorus iron continues to be sold at $17 to $17.50, furnace. Standard low phosphorus remains $21, Philadelphia. A sale of 1,000 tons for western delivery is reported. The active Brooke furnace at Birdsboro has been banked.

Iron and Steel Bars

Buyers of steel bars in this district now seem to be pretty well covered for several months ahead and there is little contracting at present. Specifications, however, continue active. While some leading bar makers are quoting 1.25c, Pittsburgh, or 1.40c, Philadelphia, at which price little if any business is being done, other makers still will do $1 less. Iron bars show some improvement and better prospects with prices remaining at 1.20c to 1.25c, mill. The Southern railroad is inquiring for 500 tons of iron and steel bars.

Plates and Shapes

The Maryland Steel Co. in the week received the award for the two government colliers upon which it recently was reported low bidder. It is understood to have placed the plates, 8,000 tons, with an eastern Pennsylvania mill at a reported low price, but the 3,000 tons of shapes still remain open. The Southern railroad has taken bids on 3,100 tons of plates, 1,200 tons of shapes and about 500 tons of bars for car construction in its own shops. A local builder of gas holders has revived tentative inquiries for 3,000 to 4,000 tons of plates. Eastern plate makers report new bookings continue on the recent improved scale. Prices are unchanged, with 1.20c, Pittsburgh, or 1.35c, Philadelphia, the usual quotation, though the Pittsburgh base sometimes is shaded by eastern makers for a close-by delivery.

Considerable buying of structural shapes for stock recently has been done in this district and many of the jobbers now are covered. Specifications from these buyers is reported good and there is a better volume for miscellaneous requirements. The usual eastern price remains 1.20c, Pittsburgh, or 1.35c, Philadelphia, but the delivered figure still sometimes is shaded $1 or slightly more at eastern Pennsylvania points for prompt specifications or where the tonnage is of attractive size.

Sheets

Makers find difficulty to accumulate much tonnage, as buying continues of a hand to mouth character. Mill operations, while full, are not economical owing to the wide range of sizes going through. Makers this week have refused some orders at 1.40c, Pittsburgh, or 1.55c, Philadelphia, for No. 10 gage and 1.45c, Pittsburgh, more generally is quoted.

Semi-Finished Steel

Billet tonnage cannot be considered active, but where buyers have contracted they are specifying very freely. Some open-hearth steel orders were booked this week as high as $22, Pittsburgh, or $24.40, Philadelphia, and the range of the eastern market is $21 to $22, Pittsburgh. Forging billets are held $4 to $5 higher.

Old Material

Under miscellaneous buying, turnings, borings, No. 1 railroad wrought and stove plate further advanced 50 cents to $1 in the week. Low phosphorus also is quotably higher, some producers now asking $16 at their plants for the best grades. The heavy melting steel situation is little changed. The dealers still are outbidding the mills and as a result of the latters' unwillingness to pay the market price material is being attracted to such neutral points as Johnstown and Pittsburgh. Brokers covering on old orders for Johnstown, taken at $12, delivered, now are offering up to $12.75, delivered, and taking their loss. One eastern Pennsylvania steel maker who sounded the market on a round tonnage found he could not buy at less than $12, delivered, and did not close. Another steel maker took several thousand tons of skeleton steel scrap or No. 2 grade at $10, delivered.

The Western Conduit Co., a subsidiary of the Youngstown Sheet & Tube Co., Youngstown, O., has opened an office at 1626 Oliver building, Pittsburgh, which is in charge of E. S. Rooney, representative of the Youngstown Sheet & Tube Co.

International Pump Distributes Tonnage

Of Which Buffalo Makers Get a Good Share—Furnaces Not Disposed to Push Rates at Present Prices

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
503-4 West St. Bldg.,
New York, Feb. 17.

The Dominion Iron & Steel Co., Sydney, N. S., now is offering Wabana, Newfoundland, iron ore to eastern Pennsylvania consumers for the season's delivery at 7 cents per unit, f. o. b. cars tidewater. This is the first time this company has offered its Wabana ore in this country. The Nova Scotia Steel & Coal Co., which for several years past has been marketing ore in this country from its Wabana deposits, is not yet soliciting, but it probably also will accept the 7 cents per unit tidewater price. In 1913, Wabana ore was marketed at 7¼ cents per unit, with the duty of 15 cents paid. Several eastern ore buyers tentatively have been inquiring for foreign ore, but no sales have resulted. Foreign ores at present are quotable from 7 to 8 cents per unit, tidewater, depending upon quality. Some sales of local eastern ores are being made usually around 7 cents per unit, delivered, though some transactions have been made at 6½ to 6¾ cents per unit, delivered.

Pig Iron

Greater reluctance on the part of makers to push sales at the expense of prices, leaves the metropolitan pig iron market in a less active state, which contrasts very distinctly with the brisk booking periods of January, when low quotations were general. The furnaces seem willing for the time being to stand on their present bookings and to take their chances for better prices in later periods, when consumers may show greater voluntary interest. Prices are more uniform and with the firmer condition at Buffalo, the tidewater range is fairly constant at $14.75 to $15.25 for No. 2X. Low grade iron, however, still shows irregularity and the full differentials below the tidewater quotations for No. 2X are not being observed. While the total tonnage being placed is smaller, some fair-sized lots are being closed. The International Steam Pump Co., which has been inquiring for 16,300 tons, largely foundry iron, for first half delivery to various plants, has distributed considerable of this business, aggregating, it is understood, 10,000 to 12,000 tons. Buffalo iron figured considerably in this business. The Warren Foundry & Machine Co., Phillipsburg, N. J., bought 5,000 tons of low grade from a nearby Lehigh valley maker at about $13.75, delivered. A Flemington, N. J., pipe maker also took 3,000 tons of low grade iron from the same producer. A leading New Jersey buyer asks 1,000 tons of No. 2 plain and upon final action may take considerably more. Another inquiry for 1,200 tons of Virginia and southern iron for Jersey delivery, is current. The Lackawanna railroad bought 300 tons of foundry and the New York Central railroad asks 250 tons. The Railway Steel Spring Co., which has been inquiring for 5,000 tons of low phosphorus iron, has placed 1,000 tons with a western Pennsylvania maker.

Ferro-Alloys

Some moderate selling of ferro-manganese continues, and most of the reported sales are at $39, seaboard, although several makers are asking $40, seaboard. A buyer with plants at New Castle, Del., and Chicago, divided 1,000 tons between English and domestic makers, part of which, at least, went at $39, seaboard. Makers willing to accept $39, seaboard, will not do this price on other than medium-sized lots for prompt or first half.

Plates and Bars

New plate business continues on about the scale recently noted. Eastern prices remain at 1.20c, Pittsburgh, or 1.36c, New York, but this delivered price sometimes is shaded on an attractive order.

While the steel bar market generally is quoted at 1.25c, Pittsburgh, one or two makers still will do 1.20c, Pittsburgh, or 1.36c, New York. Specifications uniformly are reported good but there is not much new buying. Most of the prices under 1.20c, Pittsburgh, outstanding before recent advances are understood to have been worked off. Common bar iron holds better at 1.20c to 1.25c, eastern mill, under some improvement in demand.

Structural Material

Some eastern Pennsylvania shape makers report their specifications still are increasing, though rather slowly, and are larger so far than in January. The tonnage is of a very miscellaneous character and small requirements are numerous. While recently there has been some buying for rebuilding depleted stocks, not all makers have received such orders. Prices in this district are firmer and 1.20c, Pittsburgh, or 1.36c, New York, generally is being quoted, while on small lots $1 higher is being obtained.

Cast Iron Pipe

Low prices on cast iron pipe have been more in evidence on lettings open the past week. Some of the shops are more aggressive for business than others and are making quotations on desirable lots that are calculated shortly to take the business. The tonnage remains good. R. D. Wood & Co. took 4,538 tons for Newark, N. J., at $19.90, delivered, for the 4s, 6s, 8s and 12s; $19.25, delivered, for the 16s, 20s and 24s, and $19, delivered, for the 30s and 36s. The same maker also will furnish 300 tons for Beverly, Mass., at $22.14, delivered, for the 4s, $22.15, delivered, for the 6s and 8s, and $22.16 for the 12s, and 240 tons of 6s and 16s for Lowell, Mass., at $22.49, delivered. The United States Cast Iron Pipe & Foundry Co. took 3,200 tons for Worcester, Mass., at $21.20, delivered, and 1,145 tons of 4s to 12s for Williamson, N. Y., at $21.50, delivered. The Warren Foundry & Machine Co. took the small pipe and the Standard Cast Iron Pipe & Foundry Co. the larger sizes of 480 tons for the Light, Heat & Power Co., Boston. Manchester, N. H., is inquiring for 780 tons, Fall River for 500 tons of 6s to 12s, to close Feb. 21, and Cortlandt. N. Y., for 300 tons.

Old Material

What sales of old material are being made to consumers are at better prices, but these usually are in odd lots and involve no large tonnages individually. The eastern steel works still hold off from paying the prices for heavy melting steel, which the brokers have established by bidding to one another or in covering upon old orders. Pittsburgh buyers are offering in the east $13.25, delivered there, for steel, and $13.50 is reported. Holders of material continue expectant of further advance and demand good prices.

A profit-sharing plan has been adopted by the Kutztown Foundry & Machine Co., Kutztown, Pa., whereby the employes shall participate in the profits above the usual dividends, which shall not be more than 8 per cent. Any errors in departments through defective workmanship, will be taken as off-sets against these benefits to the employes.

Decrease in Buying in the South

But Prices Are Firm and Furnace Owners Are Cheerful—Unfilled Orders Increase

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Feb. 17.

Pig Iron

The market in this territory experienced a slight lull during the past week in buying, but prices continue to strengthen and the advanced quotations at $11 to $11.50 for No. 2 foundry at Birmingham are generally being maintained. However, it is rumored that these figures were shaded in at least one instance within the week, in which the tonnage involved was attractive and competition between local furnace interests was keen. The report of this sale has been closely investigated and is persistently denied. While the tonnage entered during the week is smaller than any previous week within the year, furnace interests do not show any apparent anxiety as to market conditions. The fact that some days must be dark and dreary in the pig iron market is appreciated on all sides of the trade, and this lull has caused very little immediate concern. Reported sales of foundry grades for the week involve a tonnage aggregating in round figures 10,000, the bulk of which was in small lots for nearby shipment and shipment during the second quarter, while a fair volume in carload lots was for spot shipment. On all of the tonnage entered, price considerations were from $11 to $11.25 per ton, No. 2 foundry basis, f. o. b. Birmingham.

The aggregate of the unfilled tonnage on furnace order books now shows an increase over the corresponding period of last month, while stock accumulations on furnace yards show no gain whatever.

The Tennessee Coal, Iron & Railroad Co. is tearing down its No. 6 furnace at Ensley, Ala., and it is announced that the old stack is to be entirely overhauled and rebuilt.

As a result of the entering of several large rail orders by the Tennessee company, the rail mill at Ensley is announced to resume six days per week operation shortly.

Cast Iron Pipe

The condition of the cast iron pipe market is anything but encouraging. All of the manufacturers contend that there is absolutely no new business, and very little prospect of any immediate relief in view. Operations are confined to the filling of small specifications and stock requirements. The forwardings for the past week were liberal, but the bulk of the output at this time is being stocked.

Old Material

Although the past week's sales of old material in this market involved a better tonnage, prices have experienced no change. Dealers report some 900 tons of assorted grades as entered for the week, and a somewhat better demand for heavy machinery cast, while borings and stove plate were second in the lead. Greater confidence in the possibility of a better market is being shown by dealers, and there is more disposition on their part to increase holdings than has been shown for some weeks past.

Mixed Conditions Prevail in Germany

Some Recent Price Advances Not Maintained—Bolts, Nuts and Wire Depressed

Berlin, Feb. 5.

Feeling appears to be a little more hopeful about a revival in the iron trade and in one of the heavy lines merchants have purchased more freely for delivery during the first half-year, even paying 3 or 4 marks (70.50 cents or 94 cents) advance on the previous low figures. But it has proven a flash in the pan, and already it is possible again to obtain bars at the previous lowest price, Lorraine mills offering at 89 marks ($20.91½) per ton. In pig iron, the market is again depressed and in order to meet the competition of English iron, very irregular conditions have developed, especially in hematite.

Annual statistics have been published during the past week or two of which those relating to exports are especially interesting. They show that the export surplus over imports amounts for the year to 5,878,971 tons, while in 1912 this excess export surplus was only 5,368,123 tons, an increase in a single year of 510,948 tons. There was an increase in the export of shapes of 326,000 tons; in that of plates of 162,000 tons, in pipe of 40,000 tons, but the shipments abroad of rails decreased 23,000 tons, in steel sleepers of 57,000, of girders of 50,000.

The steel syndicate at its monthly meeting held on Jan. 29, stated that since the beginning of the year specifications have come in more freely, but the troubles with the railways in not being able to give prompt attention to forwarding freights has interfered with shipments. Export business is still quiet. Relief has been given by the Prussian State Railways in distributing supplementary orders of rails, sleepers, and accessories. Tram rails secured fair orders during January, both from the home and the foreign markets. Shapes are depressed, but no alteration has been made in prices for the second quarter. In Luxemburg, pig iron is very quiet, as well as in other parts of western Germany. The shipments have gradually fallen off. In October the syndicate shipped 92.75 per cent, in November 82 per cent, and in December 77.93 per cent. In January it is expected it will be only 70 per cent. Bars have, however, done better so far this month, export orders having come in pretty freely.

There has been a considerable trade in plates and sheets recently; so much so that the trade feels it can advance prices by 2½ marks (56½ cents) per ton. But there are branches, particularly in western Germany, which a week or two ago were able to raise prices from the lowest by 2 to 3 marks (47 cents to 70½ cents) and which have since been obliged to revert to the previous lowest figures. This has been the case with bars and with sheets. Bolts, nuts, and wire nails are also extremely depressed. Plates, which a fortnight ago could be sold at 103 marks ($24.20½), are now seeking orders at 100 marks ($23.50), and bar iron is obtainable at 96 marks ($22.56), Cologne freight zone, against 100 marks ($23.50) in the middle of December.

It has been decided by the building committee of the Western Methodist Book Concern, Cincinnati, to build an addition to that company's plant on Fourth street, that city, which will be either six or nine stories. The framework will be of steel. The committee will meet during the latter part of February to select an architect to prepare the plans.

ARMOR PLATE PLANT

Will Not be Decided Upon This Session if Committee Rules.

Washington, Feb. 18. (By wire.)—In requesting Secretary Daniels to consider further the matter of the government building its own armor plate plant, the House naval affairs committee will ask that he report his findings at the next session of congress. This would mean, so far as the committee is concerned, that the matter has been practically abandoned for action at this session. A floating crane to be appropriated for is to be of 150 horsepower.

Put in Daniels' Hands

Washington, Feb. 17. — It became known today through a reliable source that the naval appropriation bill, when it is introduced in the House—perhaps about March 1—will authorize Secretary Daniels, of the Navy Department, to give further and full consideration to the plan of the government building and operating its own armor plate plant. The bill, contrary to reports, will not carry a specified sum for the erection of such a plant, nor will it as much as provide for a commission to investigate the proposal of government ownership of an armor plate plant. It is known that the sub-committee having the matter in charge is opposed to the government building its own plant. Chairman Padgett, of the whole committee, is also chairman of the sub-committee.

While Admiral Strauss, chief of the ordnance bureau, did submit certain data in regard to a government armor plate plant, it was held by the sub-committee that further consideration is necessary.

It is also reported from an authoritative source that the naval appropriation bill will carry $300,000 toward the purchase of a floating crane such as is to be used at the Panama canal and which will be operated at Norfolk, Va. The crane will probably cost $400,000 or more, but the deficit would be made up by present funds credited to the navy department for this purpose, amounting to a sum in excess of $100,000. There is considerable interest in the matter of the purchase of the crane. Germany promises to be a strong bidder against the United States makers.

Another Ford Plant.—The Ford Motor Car Co., of Detroit, has purchased an acre of ground in West Walnut Hills, Cincinnati, and will erect an assembling plant with a capacity of assembling 10,000 Ford motor cars a year. The building will be equipped with a crane-way running the entire length of the building, so that material can be lifted from railroad cars at any point along the sidings, and hoisted to any floor of the building. The equipment will be of a special type, and will be furnished from the Detroit office. Work will be begun as soon as the plans have been prepared.

CAR COMPANY

Enjoyed Prosperous Year as Shown by Annual Report.

"The financial results shown have been obtained through the large volume of business done and the fact that your plants were put in first-class condition during dull years," says the Pressed Steel Car Co., in its 15th annual report covering 1913 operations. "In a word, the results were accomplished by efficiency, as with the exception of materials and specialties, the actual turnover of business was made at a lower cost and a closer margin of profit than ever before," continues the report.

Gross sales for the year were $30,967,359.76, and net profits after liberal deductions for repairs and renewals, were $2,374,816.04. The net surplus, after account had been taken of dividends and depreciation was $944,816.04, giving a gross surplus of $8,405,000.58.

Attention is called in the report to the desire of the railroads for an increase in freight rates, which, if granted, would result in increased orders for new cars and car repairs.

An expenditure of $500,000 was authorized for doubling the capacity of the steel passenger car department. An illustrated insert in the report shows the work of the Fidelity Land Co., a subsidiary concern, in providing quarters for the employes of the car company at Presston, Pa.

Completes Panama Contract

W. M. Sterritt, of the McClintic-Marshall Co., who has been in Panama for some months, superintending the excution of important steel contracts by his company for the government, has returned to this country. The McClintic-Marshall Co. now has completed the construction of a number of large lock gates at the Gatun and the Miraflores locks and of spillway gates at the Gatun locks. These lock gates were 65 x 79 feet in dimensions and the full contract involved a total of 60,000 tons of steel. The work now has been executed and has been accepted by the government.

METAL MARKETS

New York

Feb. 17.

Copper.—The refined copper market has been dull and inactive during the past week, with little new business booked. While the leading producers and selling agencies continue to quote electrolytic at 14.87½c, delivered 30 days, it is said that this price is being shaded down to 14.75c, delivered 30 days. The undertone inclines toward weakness. The best grade of casting copper is held at 14.82½c, delivered 30 days, while ordinary grades are obtainable at 14.62½c, delivered 30 days, and as low as 14.50c, cash. Prime lake may be quoted at 15 cents, cash, nominal. The price of standard copper has declined steadily during the week, although the net decline amounts only to 12s 6d. Today's London close for spot was £65 2s 6d and for three months £65 13s 9d. Exports of copper so far this month amount to 21,434 tons.

Tin.—The tin market is weak in tone and the price has declined steadily during the week, the sharpest decline having been registered during the past 24 hours. Today's close on spot in London, was £181, a decline of £3 15s since last Tuesday. One reason assigned for this downward movement, is that the leading speculative interests loaded up with the metal at high prices, and that there has been no large buying since to sustain the market. Demand here is very dull. Spot tin is offered today at 39.75c, compared with 41c last Tuesday. Arrivals so far this month total 1,225 tons, while 3,765 tons still are afloat.

Lead.—The American Smelting & Refining Co.'s New York shipment price now is 4.15c for 50-ton lots, and it is said that interest is taking all the business it can get at this price. Independent producers quote the same but are not pressing sales. The leading interest again is reported to be selling lead for export.

Chicago

Feb. 16.

New Metals.—Copper, both lake and casting, has shown considerable strength the past week, advancing ¼c to ⅜c on this market. Spelter also is somewhat heavier, showing about 65c advance. Pig tin has advanced about 1c. Other lines remain unchanged.

We quote dealers' selling prices f. o. b. Chicago as follows:

Lake copper, carload lots, 14⅞c; casting, 14⅞c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.70c; lead, desilverized, 4.08c; sheet zinc, $7.25, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 41½c; Cookson's antimony, 7½c; other grades, 6½c.

Old Metals.—No change has taken place in quotations for old metals since last week. The supply remains adequate for the demand and while considerable is being disposed of, competition has not been sufficient to change quotations.

We quote dealers' selling prices f. o. b. Chicago as follows:

Copper wire, crucible shapes, 13¼c; copper bottoms, 11½c; heavy red brass, 11½c; heavy yellow brass, 8¾c; No. 1 red brass borings, 10½c; No. 1 yellow brass borings, 7¾c; brass clippings, 9c; lead pipe, 4c; zinc scrap, 3¾c; tea lead, 3½c; No. 1 aluminum, 12½c; No. 1 pewter, 24c; block tin pipe, 33½c; tin foil, 28½c; linotype dross, 3c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3c.

Professor Jenks Questioned About His Books

In Which He Gave His Views on Trusts—Declines to Answer Judge Dickinson's Hypothetical Questions

Prof. Jeremiah W. Jenks, whose direct testimony as a witness for the defense in the United States Steel Corporation dissolution suit was reported in last week's issue of The Iron Trade Review, was again on the stand the latter part of the week for cross examination by Judge Jacob M. Dickinson, of government counsel. In addition to defending his direct testimony, he submitted further evidence.

Another interesting witness last week was President W. A. MacGonagle, of the Duluth, Missabe & Northern railroad. He described the difficulties originally encountered in the construction of this road and the Duluth & Iron Range railroad and he explained the character of the service these roads offer their shippers, saying that it differs greatly from the service usually given by railroads. He also said that the rates charged by the Lake Superior ore roads are a great deal less than is prescribed by law in Minnesota.

It is now confidently expected that counsel for the Steel Corporation will announce the conclusion of its hearings before the week is over. Only a few more witnesses remain to be called. It is not believed that government counsel will consume much time in examining witnesses in rebuttal.

Prof. Jenks' Cross-Examination

When Judge Dickinson, of government counsel, started his cross examination of Prof. Jenks, he tried to get the witness to admit that a large combination controlling from 75 per cent upward of the output of any particular line of commodities, with its manufacturing plants favorably located in different sections of the country, has an advantage over a competitor in the business if such a competitor entered the contest without having substantially equal capital. Prof. Jenks refused to give an affirmative answer and finally said his answer would depend upon a number of considerations not included in the question. Later in the examination, Judge Dickinson read from Professor Jenks' book, "The Trust Problem", published in 1900, in which the professor had stated that a combination having 75 per cent or upwards of the output, with manufacturing plants favorably located in different parts of the country, would have a decided advantage in freight rates, especially if its products were bulky, over any competitor who would set up in business, unless that competitor were to enter the contest with substantially equal capital. The attorney also read a number of other extracts. Prof. Jenks admitted that the study of economic conditions earlier led him to the conclusion that a great price change or other change may be brought about temporarily by a combination. Some of his studies were not, he said, as complete as they might have been and should have been.

By the statement of hypothetical questions, Judge Dickinson endeavored to get the witness to admit that a large combination would have a great deal of power in controlling prices, and putting competitors out of business, but Prof. Jenks refused to give unqualified answers to hypothetical questions which contained what he believed to be statements contrary to facts as applied to the Steel Corporation.

Mr. Roberts Recalled

Percival Roberts Jr., director of the Steel Corporation and one of the defendants in this suit, was called to the stand to explain a statement he made while on the witness stand last fall—to the effect that it would be an impossibility for the Steel Corporation to crush or drive its competitors out of business. He was asked to give the reasons he had in mind when he made this statement. He said that there is no exclusive market for any one producing steel in the United States, and that each manufacturer's horizon overlaps that of the other; hence the Steel Corporation, entering any intentional warfare with a competitor would necessarily invade a territory of considerable extent—more or less common to its competitors. Hence a reduction in price aimed at one would be aimed at all, and instead of a warfare against a single competitor it would mean a warfare waged between practically all the steel producing industries of the United States; and the Steel Corporation, having a larger proportion than any single one of its competitors, would share in the disastrous results not in proportion to its size, but as the square of its size.

"How are the various competitors of the Steel Corporation equipped now as to manufacturing a diversity of products, as compared with what they were at the time the Steel Corporation was formed?" asked Attorney Severance, of Corporation counsel.

Better Competitors Now

"Its principal competitors are in better shape than formerly," said Mr. Roberts. "They produce a greater line of products, and those that have not increased their line of products are suffering severely from that very fact. Probably of the older concerns the one today that shows the result of that want of diversification more than any other is the combined Pennsylvania and Maryland Steel companies. They have not diversified their products, and as a result, their financial statements last year show very badly; their works are closed, practically, and they have now obtained some eight million dollars which they are now spending on their plants for the purpose of diversifying their output."

"What was the product of the Maryland Steel Co.?"

"Practically entirely rails."

"In case of a reduction of price in one locality, you say that is quickly reflected in other localities. Why is that?"

"No one locality, in one sense of the word, is independent of others. The steel markets are so sensitive, even all over the world, that a sudden drop in prices in America would be reflected, not only in these markets, but practically in all others."

"What effect does a cut or break in the markets in one section have in the attitude of the consumers as to rushing in any buying or withholding purchases?"

"A war such as you suggest would at once cause a falling market. Buyers on a falling market withhold their requirements, consumption is reduced and demoralization follows among the producers, each struggling to obtain as much as possible of the country's consumption."

Tuesday's Hearing

Wm. G. Gray, chief statistician of the American Iron and Steel Institute, Tuesday was called to the witness stand in the United States Steel Corporation dissolution suit hearing. He was asked to submit statistics which were to be used

in correcting exhibits entered into the record during the examination of President Jas. A. Farrell, last fall.

Dr. Jenks was recalled Tuesday morning for further cross-examination by Judge Dickinson. He was questioned further regarding various statements incorporated in the books and reports he has written during the last 10 years. One of these extracts was read from the report on the cost of living in the state of Massachusetts.

"After these studies of prices as they are indisputably affected by the Steel Corporation, the Standard Oil Co. and the American Sugar Refining Co.," Judge Dickinson read from the report, "it is interesting to turn to prices in some other lines, which clearly are not affected by the trusts, and to note the comparison."

The attorney called attention to another paragraph in this report, in which the author had described the causes leading up to the industrial combinations which were formed in various lines of manufacture. The author also stated that three influences, a standard product, very large capital and popular trademarks, seemed to have been particularly powerful in bringing about the most successful combinations.

The witness admitted that he was the author of these statements.

Dr. Jenks was asked whether or not there was any method other than by the use of index figures, by which prices during months within various years of contrasted periods, could be compared so as to show the control of prices exerted by a combination. The witness replied that any diagram taken by itself can show prices or control by a combination, but that the comparison would be within limits. The only accurate, scientific method, he said, was by the use of index figures.

Judge Dickinson took up a statement made by the witness in direct examination, to the effect that the period 1895-1901, inclusive, which he had taken as the basis of comparison with other periods, was the period, more than any other that might have been selected, of the lowest prices for steel. The judge wanted to know if it were not a fact that within various periods within those years, the low prices of steel were largely brought about by severe competition. Dr. Jenks replied that it was his impression that severe competition was one influence toward keeping down the prices of steel during that period.

The attorney asked the witness to state whether he knew of any period within the history of this country when so large a percentage of the output of any industry was under one control, as that which was under the control of the United States Steel Corporation, from the time of its organization to Oct. 26, 1911. The witness replied that the Corporation does not control as large a percentage of the steel output of the country as is controlled in some other lines by other corporations. He said, however, that no concern before or since, has controlled such a large percentage of the steel output as the Corporation.

The government attorney then put the witness through a lengthy examination as to his general knowledge of the history of the steel business. He also questioned him as to his knowledge of the details of steel manufacture.

Topping on Stand

New York, Feb. 18. (By wire.)—John A. Topping, on the witness stand in the Steel Corporation hearings this morning, was asked by government counsel to submit a record of the Republic Iron & Steel Co.'s minimum selling prices for the last eight years. He first objected to this, saying it would do his company harm. Later he said he would decide what to do after consulting his counsel.

Hearings adjourn today until Friday.

Illinois Central R. R. Orders Rails

But Rail Buying is Not Active—Inquiry for Motive Power Improves—Some Car Orders

New York, Feb. 18. (By wire.)—The Illinois Central railroad has placed 17,500 tons of rails with the Tennessee Coal, Iron & Railroad Co., the largest part of which is for the Central Railroad of Georgia. The St. Louis & San Francisco also has given the Tennessee company 6,000 tons of rails. The Illinois Steel Co. reports about 14,000 tons additional, including an order for the Omaha road. About 50,000 tons of car material was placed with mills in the Chicago district the past week, covering recent car orders. The American Car & Foundry Co. bought the heaviest, placing about 40,000 tons. The Bettendorf Co. was also a liberal buyer.

The Virginian railroad has placed 1,000 gondola cars with the Standard Steel Car Co. and the Northern Pacific has awarded 250 ore cars to the Pressed Steel Car Co. The Southern railroad has issued a formal inquiry for 2,000 cars, divided 1,300 box, 500 flat, 125 stock and 25 poultry cars.

Inquiry for motive power continues more active. A leading locomotive builder recently received in one day inquiries aggregating a larger total than the number of locomotives built by it during the entire last half of 1913. Rail sales are few. The Interborough Rapid Transit Co. has placed 5,000 tons and the Pacific Electric Co. 4,000 tons of girder rails.

President A. H. Smith, of the New York Central lines, officially announces the placing of about 60,000 tons of rails with the Lackawanna and Illinois Steel companies as a part of the 1914 requirements of that system. This order was reported previously, and as then stated, it indicates the total year's requirements of the New York Central lines will be about 140,000 to 150,000 tons. The Queen & Crescent railway has ordered 2,500 kegs of spikes from a Pittsburgh maker. Complete estimates show that the large joint railway bridge across the Mississippi river at Memphis, now up for bids, will require from 20,000 to 22,000 tons of steel, including 4,500 tons for approaches and 16,000 to 17,000 for the bridge proper.

Some railroad car buying is appearing but efforts are being made to keep it under cover. Two orders for 1,500 cars each are known to have been placed with western makers. One order included 1,000 coal cars and 500 refrigerator. The Chicago & North Western Ry. Co. has bought a large tonnage of center sills for reinforcing freight cars from the American Car & Foundry Co.

CARS AND LOCOMOTIVES.

The Lake Shore & Michigan Southern railroad is inquiring for 50 locomotives.

The New York Central railroad is inquiring for 25 switching locomotives.

The Delaware, Lackawanna & Western railroad has ordered 14 Pacific type locomotives of the Lima Locomotive Corporation.

The Chesapeake & Ohio railroad has placed 22 locomotives with the American Locomotive Co.

The Tennessee Central Railroad Co. has placed two consolidation freight locomotives with the American Locomotive Co.

The Southern railroad is in the market for 21 locomotives.

The Detroit Terminal has bought three six-wheel switching locomotives from the Ameri-

can Locomotive Co. They will be equipped with superheaters.

The Hocking Valley has taken bids on 10 locomotives.

The Virginian Railroad is negotiating with builders on revised specifications for about 1,000 gondola cars.

RAIL SALES.

The Interborough Rapid Transit Co. has divided 5,000 tons of rails between the Lackawanna Steel Co. and the Bethelhem Steel Co.

The Pacific Electric Co. has placed 4,000 tons of girder rails with the Lorain Steel Co.

STRUCTURAL LETTINGS

Show Some Improvement—Elevated Contract.

The leading new requirement for structural steel placed in the east in the week was the blanket construction contract for the third tracking of three elevated railroad lines in Manhattan and the Bronx, awarded by the Interborough Rapid Transit Co. to three general contractors. At least 50,000 tons of steel are involved. Certain eastern districts, notably Philadelphia, where recent structural projects have been quite limited, now are showing a better tonnage, either already in the market or in prospect. Awards in New York City are coming more slowly, but considerable tonnage apart from elevated and subway work is pending.

More numerous inquiries are reported by fabricators in the Pittsburgh district, and there is a tendency toward higher prices, although low quotations have not been withdrawn in all cases. From a tonnage standpoint, the last four or five weeks have been the best for several months.

Structural lettings in the west the past week, while not strong, are somewhat better than the preceding period. Railroad buying furnished most of the tonnage and includes a considerable order for center sills for freight car work.

CONTRACTS PLACED.

Commerce and Labor building, Washington, D. C., 400 tons, awarded to Dietrich Bros.

Packer No. 5 breaker for Lehigh Coal Co., near Shenandoah, Pa., 600 tons awarded to Guerber Engineering Co.

Buildings for Standard Seamless Tube Co., Economy, Pa., 800 tons, McClintic-Marshall Co.

Building for Cleveland-Akron Bag Co., Akron, O., 1,400 tons, T. H. Brooks Co.

Chicago & North Western Ry. Co., center sills for reinforcing freight cars, 8,560 tons, to the American Car & Foundry Co.

Sanitary District of Chicago, Jackson street bridge, Chicago, 1,514 tons, to the Mount Vernon Bridge Co.

Chicago, Rock Island & Pacific Ry. Co., Seventy-ninth street crossing, Chicago, 1,000 tons, to the American Bridge Co.

The Warren Steel Construction Co., Syracuse, was low bidder on the steel for the Onondaga Hotel addition, Syracuse, taking about 1,200 tons.

The Onondaga Structural Steel Co., Syracuse, has secured the contract for the steel in the Onondaga county tuberculosis hospital administration and infirmary building, requiring about 400 tons.

Center street loop, elevated railroad extensions, Brooklyn, 1,000 tons, awarded Phoenix Bridge Co.

Transformer building, New York Edison Co., New York City, 1,500 tons, awarded Levering & Gerrigues.

General contract for third track of remaining portions of Second, Third and Ninth avenue elevated lines, Manhattan and Bronx, awarded by Interborough Rapid Transit Co. jointly to Terry & Tench, Snare & Triest and T. A. Gillespie Co. on a percentage basis. Estimated at least 50,000 tons of steel will be required.

Astor loft building, Twenty-third street, New York City, 1,500 tons, awarded Levering & Gerrigues.

Soap factory, Cambridge, Mass., for Lever Bros., 500 tons, awarded G. W. & S. Smith.

Courthouse, Raleigh, N. C., 400 tons, awarded Richmond Structural Steel Co.

Two dredges, 880 tons, for Toronto harbor improvements, awarded by Canadian Stewart Co. to Polsen Iron Works and 400 tons for a derrick scow placed with Beatty & Sons.

Cleveland & Youngstown railroad, 1,200 tons reinforcing bars, Lackawanna Steel Co.

Section No. 9, White Plains elevated railway, Manhattan, 12,000 tons, general contract placed with the Oscar Daniels Co. and the steel work is expected to go to the American Bridge Co.

CONTRACTS PENDING.

Catenary supports for electrification of Paoli division of Pennsylvania railroad, 900 tons. Bids asked. This represents only partial tonnage and several thousand additional will be required.

Widener office building, Philadelphia, 4,000 to 5,000 tons. Bids asked.

Central high school, Washington, D. C. Revised bids asked. Steel requirements originally estimated at 900 tons.

Nanticoke high school, Wilkesbarre, Pa., 200 tons. Bids asked.

Locust street school, Hazelton, Pa., 150 tons. Bids asked.

Approaches for large joint railroad bridge across Mississippi river at Memphis, 4,500 tons. Bridge proper upon which bids also asked, will require, as previously reported 16,000 to 17,000 tons, making total steel requirements 20,500 to 21,500 tons.

Shop building for American Road Machine Co., Goderick, Mich., 500 tons. Bids asked.

Track elevation work in South Philadelphia for city and Pennsylvania railroad, 5,000 tons at least. Bids expected to be asked soon.

Office building for the Texas Co., Port Arthur, Tex., 600 tons, general contract awarded Geo. A. Fuller Co.

Addition to the Onondaga Hotel, Syracuse, 900 tons, Whitney Co., New York, low bidder.

National guard armory, Syracuse, 800 tons, bids being taken.

Reconstruction of Steinway tunnel, New York City, for subways, 400 tons, Rapid Transit Construction Co. low bidder on general contract.

Great Northern Railway Co., 4,000 tons, fabricated bridge material.

The Consolidated Milling Corporation, Buffalo, is to erect a mill and elevator taking about 400 tons of reinforcing bars.

MORE TIME NEEDED

To Investigate Merits of Proposed Advance in Rates.

Washington, Feb. 17.—The Interstate Commerce Commission yesterday announced that it has further suspended, until Sept. 12, the so-called 5 per cent advance in rate tariffs of the eastern railroads. Original suspension of the tariffs dated from Nov. 12, 1913, until March 15, 120 days being the limit of suspension the first time, while upon second suspension the period may be extended six months, as was done in this instance. No suspension after 10 months from the time of filing the tariffs can be made, unless railroads accede to a request of a commission for such action. Upon granting proposed tariffs, the commission must give railroads 30 days' notice in which to prepare them according to the commission's findings. This would mean that the eastern railroads would have to be notified by Aug. 12 whether tariffs seeking increased rates had been granted, unless they were to agree to still further suspension. It was realized from the first that the commission would be unable to report on the present case in time to allow it to become operative or inoperative, as the situation may be, by March 15. A vast amount of data and a large number of hearings are yet before the Commission.

Coke is Stronger

Pittsburgh, Feb. 18. (By wire.)—Announcement that blast furnace coke has sold above $2, ovens, has tended to strengthen the Connellsville coke market. No standard coke is being offered for second quarter at less than $2, ovens. Quotations as high as $2.15 and $2.20 are reported. The spot market has not changed its position and it is claimed that one consumer still is buying spot coke at $1.75, ovens. Not much fuel is being offered for prompt shipment.

Heavy Rails Demanded

New York, Feb. 18. (By wire.)—Issuance of new specifications which are now in the hands of rail makers has been an important factor in delaying the placing of the Pennsylvania rail order and new specifications call for an unusually heavy section in excess of 100 pounds, the present section of this system.

W. P. Snyder, president of W. P. Snyder & Co., Pittsburgh, is enjoying a vacation at Palm Beach, Florida.

WORCESTER MEETING

Of National Metal Trades Association to be Held in April.

Chicago, Feb. 18. — Preparations have been made for the national convention of the National Metal Trades Association at Worcester, Mass., April 20-23, inclusive. The Hotel Bancroft will be headquarters.

The executive committee will meet at 6 p. m., Monday, April 20. The administrative council will be in session all day Tuesday, April 21. The alumni dinner will be served at 7 p. m. Tuesday.

A meeting of local presidents, secretaries and members of the administrative council will convene Wednesday morning at 10 o'clock. A buffet luncheon will be served to all members in attendance Wednesday at 10 o'clock.

The convention proper will convene Wednesday afternoon at 2 o'clock and the annual banquet will be served at 7 o'clock that evening. The convention sessions Thursday will begin at 9 a. m.

The incoming administrative council will hold its first meeting for organization Thursday afternoon, April 23.

Dates for the annual meetings of the various branches are being set and the following have been definitely announced: Boston, March 4 (tentative); Cleveland, March 5; Cincinnati, March 5; Indianapolis, March 4; New Haven, Conn., March 3; Providence, R. I., March 12; Springfield, Mass., March 27; St. Louis, March 10 (tentative). The meeting of the Pittsburgh branch was held Feb. 10.

Active Selling of Tubes

New York, Feb. 18. (By wire.)—Tubes are making one of the best showings of the whole finished steel situation. Mill bookings of the National Tube Co. for the first half of February exceed those of the similar periods in January, which in turn was the best month since August.

Gronwall Furnace in America

John A. Crowley, president of the John A. Crowley Co., 120-122 Liberty street, New York City, has returned from England where he concluded negotiations for the exclusive representation of the Gronwall electric steel-making furnace for this country.

This furnace is perhaps better known in this country in connection with the ore-smelting furnace of the same name which has been successful in smelting Swedish ores. The steel melting and refining furnace has now been brought to a stage where it is being successfully operated in several of the English mills.

The John A. Crowley Co. will install one of these furnaces as soon as a suitable location can be secured especially for the production of higher grades of alloy steels, although the output will not be entirely limited to this class of material, but will include the high carbon tool and spring steels. Considerable attention will also be given to producing a high grade steel for castings for which line of work the furnace is particularly adapted.

GOOD SHOWING

Made by February Bookings of the Steel Corporation.

New York, Feb. 18. (By wire.)—Despite some contrary reports, February new business of the Steel Corporation continues to maintain a rate of over 10,000 tons daily larger than the January average. New bookings this month to date have averaged in excess of 50,000 tons daily. The Corporation continues to operate 80 per cent ingot capacity. Pig iron output is at a somewhat lower rate, but gradually is being increased. Additional furnaces are going on this week, one each at Lorain, McKeesport, Braddock and South Chicago.

NAVAL YARDS

Will Build Supply Ship and Transport For Government.

Washington, Feb. 18. (By wire.)—Secretary Daniels has announced that he will award to the Boston and Philadelphia navy yards respectively contracts for a supply ship and a transport. The supply ship will cost $1,171,713, and the transport $1,458,000.

Rail and Car Orders

New York, Feb. 18. (By wire.)—The Soo line has placed its rail order with the Illinois Steel Co. The Cambria & Indiana railroad has ordered 500 hoppers of the Cambria Steel Co.

Heat Treatment Plant

New York, Feb. 18. (By wire.)—A heat treatment plant is to be added to the Howard Axle Co. works of the Carnegie Steel Co., at Homestead. About $100,000 will be added to the appropriation already made.

LARGE EARNINGS

Shown by Cambria Steel Co. in Annual Report.

The excellent report of the Cambria Steel Co., Johnstown, Pa., for the fiscal year ended Dec. 31, 1913, shows an increase of $3,341,260 in earnings. After deductions for replacements, fixed charges and dividends, a surplus of $3,534,949 remained. The total surplus now stands at $20,520,175. The income account for 1913 and comparison with 1912 follows:

	1913.	Increase.
Oper. inc.....	$7,579,813.46	$3,278,432.66
Inc., rent, inven. and int.	208,156.11	62,827.57
	$7,787,969.57	3,341,260.23
Extra replac. and exht. of min..	1,099,439.73	554,082.00
Net	$6,688,529.84	2,787,178.84
Fixed ch. Cam Iron lease ...	453,579.90	†46,688.00
Net inc.	$6,234,949.94	2,823,866.93
Dividends	2,700,000.00	450,000.00
Net surplus.....	$3,534,949.94	2,373,866.94
Prev. surplus....	19,635,225.90	
Less charges....	*2,650,000.00	
	$16,985,225.90	
Sur. Dec. 31, '13	20,520,175.84	

*The amount of $2,650,000 was set aside out of surplus accounts, aggregating $19,635,225.90, to cover adjustments, repairs, replacements, etc.

†Decrease.

The principal expenditures during the year for plant additions, aggregating $654,510.59, included an extension to the ore yards at the Franklin works, installation of cranes and other equipment, enlarging of blast furnace, purchase of four 5-ton electric locomotives, and other items. Pres. William H. Donner, in his remarks to stockholders says:

"The demand for steel products was such that your production and shipments exceed any previous year, but there was quite a slowing down in business during the last quarter and low prices prevailed. Specifications in November and December were so curtailed as to restrict tonnage, despite which fact, inventory of products was increased. Your output of pig iron was a record notwithstanding that the blast furnaces have had a long campaign and all, with one exception, will shortly require relining.

"During the last three months, all of your men were employed, the excess not required in current operations being assigned to general repair and construction work, so that practically the entire force of approximately 16,000 men were continuously employed, and at the highest rate of wages in the history of the company.

The Rockford Milling Machine Co., Rockford, Ill., has increased its capital from $50,000 to $100,000.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through First Half 1914.)

Bessemer	$15.15
Basic	14.15
No. 2 foundry	14.15 to 14.40
Malleable	14.15 to 14.40
Gray forge	13.65 to 13.90

(The freight from valley points is 90c.)

CLEVELAND

(Through First Half 1914, Delivered in City.)

N. 1 foundry	$14.50 to 14.75
No. 2 foundry	13.75 to 14.00
No. 2 southern	15.10 to 15.35
Bessemer	15.15
Silveries	17.30 to 17.55

CINCINNATI

(Prompt and First Half.)

Southern foundry No. 1	$14.25 to 14.75
Southern foundry No. 2	13.75 to 14.25
Southern foundry No. 3	13.25 to 13.75
Southern foundry No. 4	13.00 to 13.50
Southern gray forge	12.75 to 13.25
Mottled	12.75 to 13.00
Southern No. 1 soft	14.50 to 15.00
Southern No. 2 soft	14.00 to 14.50
Southern Ohio No. 2	14.25 to 14.70
Southern Ohio No. 3	13.70 to 14.20
Southern Ohio No. 4	13.45 to 13.95
Silveries, 8 per cent silicon	17.70 to 18.20

(Freight from Ironton, $1.20; from Birmingham, $3.25.)

CHICAGO

(Delivered Chicago, until July 1, 1914, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.)

Lake superior char., No. 1 to 4	$15.50
Northern foundry No. 2	14.00 to 14.25
Southern foundry No. 2	18.40
Jackson Co. silveries, 8 per cent	16.85
South'n silveries, 5 per cent sil.	14.85
Alabama basic	14.85
Malleable	14.00 to 14.25

PHILADELPHIA

(Prompt and first half delivery, prices based consumers' plants in Philadelphia and vicinity unless otherwise specified.)

Northern No. 1X foundry	$15.25 to 15.50
Northern No. 2X foundry	14.75 to 15.25
Northern No. 2 plain	14.50 to 14.75
Standard forge (Eastern Pa.)	13.90 to 14.00
Virginia No. 2X	15.55 to 15.80
Southern No. 2	14.75 to 15.00
Standard low phos., Phila.	21.00 to 21.25
Lebanon low phos., furnace	17.00 to 17.50
Malleable	15.25 to 15.50
Basic (Eastern and Central Pa.)	14.25 to 14.50
Middlesbrough, English No. 3 (on dock)	15.00 to 15.25

NEW YORK

(Prompt and first half delivery, prices based at Jersey City, at Newark, and at Jersey points near tidewater.

Northern No. 1X foundry	$15.25 to 15.50
Northern No. 2X foundry	14.75 to 15.25
Northern No. 2 plain	14.50 to 14.75
Virginia No. 2X	15.85 to 16.10
Southern No. 2	14.75 to 15.25
Malleable	14.75 to 15.00
Gray forge	14.00 to 14.25

ST. LOUIS

(Throughout This Year.)

Southern No. 1	$15.00 to 15.50
Southern No. 2	14.50 to 15.00
Southern No. 3	14.00 to 14.50
Southern No. 4	13.75 to 14.00

(Freight, Birmingham to St. Louis, $3.75.)

BIRMINGHAM

(For southern delivery.)

No. 1 foundry	$11.50 to 12.00
No. 2 foundry	11.00 to 11.50
No. 3 foundry	10.50 to 11.00
No. 4 foundry	10.25 to 10.75
Gray forge	10.25 to 10.75
Mottled	10.25
Standard basic	10.75 to 11.25
Basic	11.00 to 11.50
Off basic	10.50 to 11.00
Charcoal	25.00

BUFFALO

(Delivered in city first and second quarters.)

No. 1 foundry	$13.25 to 13.50
No. 2X foundry	13.00 to 13.25
No. 2 plain	13.00
No. 3 foundry	12.75 to 13.00
Gray forge	12.75 to 13.00
Malleable	13.00 to 13.50
Basic	13.50 to 14.00
Charcoal	15.50 to 16.50.

Ferro Alloys

English and German 80 per cent ferro manganese, prompt and forward delivery, $39 to $40, seaboard.

Fifty per cent ferro-silicon, $73, Pittsburgh, or Philadelphia, for carloads; $72 for larger lots, and $71 for 600 tons or more. Twelve to 13 per cent, $23. Eleven to 12 per cent, $22. Ten to 11 per cent, $21. Nine to 10 per cent, $20, f. o. b. Globe, Jisco, and Ashland furnaces. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium, 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4. Freights from Philadelphia and New York, 10 to 30 cents higher, respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16	cents
Philadelphia	15	censt
Boston	18	cents
Buffalo	11	cents
Cleveland	10	cents
Cincinnati	15	cents
Chicago	18	cents
Denver	84½	cents
St. Louis	22½	cents
New Orleans	30	cents
Birmingham	45	cents
Pacific coast, plates and shapes.	80	cents

Coke

AT THE OVENS.

Connellsville district:	Prompt shipment.	Contract.
Foundry coke	$2.40 to 2.65	$2.50 to 2.75
Furnace coke	1.85 to 1.95	2.00 to 2.10
Wise county district:—		
Foundry coke	$2.50 to 3.10	$2.65 to 3.10
Furnace coke	2.00 to 2.10	2.10 to 2.25
Pocahontas district:—		
Foundry coke	$2.50 to 2.75	$2.50 to 2.75
Furnace coke	2.15 to 2.40	2.25 to 2.60
New River district:—		
Foundry coke	$2.85 to 3.50	$2.85 to 3.50
Furnace coke	2.50 to 2.75	2.50 to 2.75

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer prices are: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign Bessemer and non-Bessemer ores, ranging from 50 to 65 per cent in metallic iron content, 7 to 8 cents per unit, f. o. b. cars eastern seaboard, depending on quality. Freight rates from Philadelphia to eastern Pennsylvania furnace points range from 35 to 75 per cents per ton.

Semi-Finished Material

PITTSBURGH

Bessemer 4 x 4 billets with 0.25 carbon and less, $21; open-hearth rolling billets, $21; Bessemer sheet bars, $22; open-hearth sheet bars, $22; f. o. b. maker's mill, Pittsburgh & Youngstown. Forging billets $24 $to $25, Pittsburgh. Wire rods, $26.00 to $26.50; muck bar, $28, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity; 4 and 4-inch open-hearth Bessemer, rolling billets at $23.40 to $24.40; and forging billets from $27.40 to $28.40; muck bar, $26.00 to $28.00.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.20c to 1.25c. For extras, see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.38c.

PHILADELPHIA

Standard structural shapes, base sizes, delivered to consumers' plants in Philadelphia and vicinity, 1.30c to 1.35c.

NEW YORK

Standard structural shapes, base sizes, delivered in metropolitan district, 1.36c to 1.41c.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¾ to 100 inches, 1.20c to 1.25c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inches thick, 6⅝ to 100 inches wide, 1.38c to 1.43c.

PHILADELPHIA

Tank plates, base sizes, delivered to consumers' plants in Philadelphia and vicinity, 1.30c to 1.35c.

NEW YORK

Tank plates, base sizes, delivered in the metropolitan district, 1.36c.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	1.95c to 2.00c
No. 28 tin mill black	1.90c to 1.95c
No. 28 galvanized	2.95c to 3.00c
No. 10 blue annealed	1.40c to 1.45c
No. 28 painted corrugated	2.15c to 2.20c
No. 28 galvanized, corrugated	3.05c to 3.10c
Tin plate, 100-pound cokes	$3.40

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage blue annealed sheets at 1.60c to 1.65c.

Pipe and Boiler Tubes

PITTSBURGH

	Black-Galv. Butt-Weld.	
Steel, ¾ to 3 inches	79½	71
Iron, ¾ to 2½ inches	70	61
	Lap-Weld.	
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	71	..
Iron, 3½ to 4½ inches	60	..

Other sizes of pipe and tubes take the usual advances as per official card.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.35c for open-hearth carload lots; less than 500 tons, 1.35c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.00c base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.45c to 1.50c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $21.50 to $22.50; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Chicago:

Angle bars, 1.50c; railroad spikes, 1.55c; smaller sizes, spikes, 1.75c base; track bolts with square nuts, 2.00c to 2.05c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.30c to 1.35c, Pittsburgh; Bessemer and open-hearth steel bars, 1.20c to 1.25c; plow and cultivator, 1.20c to 1.25c; channels, angles, zees, tees, under 3 inch, 1.30c to 1.35c, all f. o. b. mill.

Hoops in carload lots, 1.30c to 1.35c, Pittsburgh; in less than carload lots, 1.45c to 1.50c; bands, 1.20c to 1.25c base, with net extras as per standard steel.

Cold rolled and ground shafting, 63 to 65 per cent off in carloads and 58 to 60 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron, 1.20c; hard steel bars, rerolled, 1.30c; soft steel bars, bands and small shapes, 1.38c to 1.43c; hoops, 1.48c; smooth finished machinery steel, 1 inch and larger, 1.68c; shafting, 63 to 65 per cent off list for carload lots, 60 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars, 1.35c to 1.40c on contract, and common bar iron, 1.22½c to 1.32½c. Cut nails, 1.80c to 1.90c, Philadelphia. Shafting, 64 to 65 off in carloads and 62 to 63 off in less than carloads in base territory.

NEW YORK

Soft steel bars, delivered in the metropolitan district, 1.36c to 1.41c; common iron bars, 1.25c to 1.30c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 1.60c to 1.65c, Pittsburgh; cone head boiler rivets, 1.70c to 1.75c. Smaller rivets, 80 and 10.

Structural rivets, Chicago, 1.78c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 80 and 2½; cut threads, 75 and 17½; larger and longer, 70 and 15.

Machine bolts and hot pressed nuts ⅜ x 4 inches, smaller and shorter, rolled, 80 and 7½; cut, 80 and 2½; larger and longer, 70, 10 and 10.

Gimlet and cone point lag or coach screws, 80 and 20.

Hot pressed square, blank and tapped nuts, $6.00 off list; hot pressed hexagon blank or tapped, $6.70.

Cold pressed, C. & T. square, blank, or tapped, $3.80 off; hexagon, blank or tapped, ⅝ inch and larger, $6.80; ½-inch and smaller, $7.40.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.60; retailers' carload lots, $1.65; cut nails (western makers) jobbers' lots, $1.60; painted barb wire, jobbers' carload lots, $1.60; retailers' carload lots, $1.65; plain wire to jobbers in carloads, $1.40; and to dealers in carloads, $1.45; polished staples, $1.60; galvanized staples, $2.00.

CHICAGO

Wire nails, jobbers' carload lots, $1.78; retailers' carload lots, $1.83; retailers' less than carload lots, $1.88; painted barb wire, jobbers' carload lots, $1.78; retailers' carload lots, $1.83; retailers' less than carload lots, $1.88, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.58; retailers' car load lots, $1.63.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $26; 6 to 12 inches, $24; larger sizes, $23.50; gas pipe, $1 a ton higher.

NEW YORK

Six-inch, 30 pounds to the foot, $22 to $23, f. o. b. New York, in carload lots.

BIRMINGHAM

Water main, 4-inch, $22.50; 6-inch and up, $19.50. Gas main: $1 per ton higher than water main. Special fittings, $47.50 to $52.50.

Old Material

PITTSBURGH

(Gross Tons Delivered.)

Heavy melting scrap	$12.75 to 13.00
Rerolling rails	13.50 to 14.00
Malleable	10.75 to 11.25
Bundled sheet scrap	9.00 to 9.25
Iron axles	23.00 to 23.50
Old iron rails	13.50 to 14.00
Stove plate	9.50 to 9.75
No. 1 wrought scrap	12.00 to 12.25
Old car wheels	12.75 to 13.25
Low phosphorus	15.00 to 15.50
Machine shop turnings	8.25 to 8.50
No. 1 busheling	11.00 to 11.25
Cast borings	8.75 to 9.25
No. 1 cast scrap	12.25 to 12.50

PHILADELPHIA

Gross tons delivered to consumers' plants, in eastern Pennsylvania and western New Jersey:

Old iron rails	$16.00 to 17.00
Old steel rails (rerolling)	13.50 to 14.00
No. 1 heavy melting steel	11.50 to 12.00
Old car wheels	13.00 to 13.50
Old iron axles (nominal)	22.00 to 23.00
Old steel axles	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
Wrought pipe	11.00 to 11.50
Cast borings	9.25 to 9.75
Machine shop turnings	8.25 to 9.25
Heavy cast (broken)	13.00 to 13.50
Malleable	10.00 to 10.50
Stove plate	10.50 to 11.00
No. 1 forge	8.50 to 9.00
Low phosphorus	14.50 to 15.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg, and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$14.50
Old steel rails (under 3 ft.)	13.50 to 14.00
Old steel rails (over 6 ft.)	13.00 to 13.50
Relaying rails	23.00 to 25.00
Old steel boiler plate	10.50 to 11.00
Malleable iron (railroad)	11.50 to 12.00
Axle turnings	8.75 to 9.00
Malleable iron (agricultural)	9.00 to 9.50
Steel axles	16.50 to 17.00
Heavy steel	11.50 to 12.00
Country mixed steel	9.00 to 9.25
Bundled sheet scrap	7.50 to 8.00

Net Tons

No. 1 R. R. wrought	$12.00 to 12.50
No. 1 busheling (new)	10.25 to 10.75
No. 1 busheling (old)	9.50 to 10.00
No. 1 machine cast	11.00 to 11.50
No. 1 dealers' wrought	9.00 to 9.50
Machine shop turnings	6.25 to 6.50
Pipes and flues	9.00 to 9.50
Cast borings	7.50 to 8.00
Stove plate	9.00 to 9.50
Wrought iron arch bars (nom.)	13.00
Wrought iron piling plate	13.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons

Old car wheels	$11.75 to 12.25
Rerolling rails (5 ft. and over)	11.25 to 11.75
Old steel rails (3 ft. and und.)	10.50 to 11.00
Frogs, switches and guards	9.75 to 10.25
Heavy melting steel	10.00 to 10.50
Shoveling steel	9.00 to 9.50

Net Tons

No. 1 R. R. wrought	$ 9.75 to 10.00
No. 2 R. R. wrought	9.00 to 9.50
Arch bars and transoms	13.00 to 13.50
Knuckles, couplers and springs	9.50 to 10.00
Shafting	12.00 to 12.50
Iron car axles	18.00 to 18.50
Steel car axles	12.75 to 13.25
Locomotive tires	11.00 to 11.50
Cut forge	8.75 to 9.25
Pipe and flues	7.75 to 8.25
No. 1 cast	10.50 to 11.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.50 to 7.00
No. 1 boiler cut	7.25 to 7.75
Boiler punchings	9.75 to 10.25
Cast borings	5.50 to 6.00
Machine shop turnings	5.50 to 6.00
Agricultural malleable	8.75 to 9.25
Railroad malleable	10.00 to 10.50
Angle bars, splices, etc., iron	12.50 to 13.00
Angle bars, steel	8.75 to 9.25
Stove plate and light cast scrap	9.50 to 10.00

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for eastern Pennsylvania delivery:

Old car wheels (Jersey points)	$12.00 to 12.50
Heavy steel axles	14.00 to 14.50
Steel shafting	12.50 to 13.00
No. 1 heavy melting steel	8.50 to 9.00
No. 1 R. R. wrought	12.00 to 12.50
Wrought pipe (not galvanized)	8.50 to 9.00
Clean cast borings	6.50 to 6.75
Machine shop turnings (nom.)	6.00 to 6.50
Heavy turnings	6.25 to 6.50
Heavy cast (Jersey points)	12.00 to 12.25

Stove plate	$ 8.00 to 8.25
Grate bars	7.50 to 7.75

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J.; $1.10 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, N. J., $1.10 from New York.

CINCINNATI

Gross Tons

Old iron rails	$11.00 to 11.50
Old steel rerolling	10.25 to 10.75
Old iron axles	16.00 to 16.50
Heavy melting scrap	9.25 to 9.75
Relaying rails	19.25 to 19.75

Net Tons

Old No. 1 R. R. wrought	$ 8.75 to 9.25
Bundled sheet scrap	5.00 to 5.50
No. 1 yard wrought	7.00 to 7.50
No. 1 machine cast	10.25 to 10.75
No. 1 busheling	6.50 to 7.00
Stove plate	7.25 to 7.75
Machine shop turnings	4.75 to 5.25
Cast borings	4.75 to 5.25
Heavy turnings	5.50 to 6.00
Mixed cast	8.00 to 8.50
Breakage	5.75 to 6.25
Malleable	7.00 to 7.50

BIRMINGHAM

Old iron axles (light)	$15.00 to 15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	12.50 to 13.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	10.00 to 10.50
No. 2 country worught	8.50 to 9.00
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Tram car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.25

BUFFALO

Gross Tons

Heavy melting steel	$10.50 to 11.00
No. 1 R. R. and mch. cast scrap	12.00 to 12.50
No. 1 R. R. wrought scrap	12.00 to 12.50
Old steel axles	17.00 to 17.50
Old iron axles	22.50 to 23.00
Car wheels	12.00 to 12.50
Railroad malleable scrap	10.75 to 11.25
Machine turnings	6.50 to 7.00
Heavy axle turnings	8.25 to 9.00
Cast iron borings	6.75 to 7.25
Low phos. steel scrap	15.50 to 16.25
Old iron rails	15.00 to 15.50
Boiler plate sheared	11.50 to 12.00
Bundled sheet scrap	6.25 to 6.75
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	9.50 to 10.00
No. 1 busheling scrap	9.50 to 10.00
No. 2 busheling scrap	7.00 to 7.50
Wrought pipe	8.50 to 9.00
Bundled tin scrap	12.00

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$11.25 to 11.75
Old iron rails	12.00 to 12.25
Re-rolling rails (5 ft. and over)	12.00 to 12.50
Old steel rails (3 ft. and und.)	11.25 to 11.50
Light sec. relayers (45 pounds and und.) subject to inspec.	23.00 to 23.50
Relaying rails, subject to inspec.	23.00 to 23.50
Frogs, switches and guards (cut apart)	11.00 to 11.50
Shoveling steel	9.00 to 9.50

Net Tons

No. 1 railroad wrought	$ 9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Arch bars and transoms	12.00 to 12.50
Knuckles, couplers, springs	9.50 to 12.00
Shafting	13.00 to 13.50
Steel car axles	13.00 to 13.50
Iron car axles	18.00 to 18.50
Locomotive tires	10.00 to 10.50
Pipe and flues	6.50 to 7.00
Tank iron and cut boilers	6.50 to 7.00
No. 1 cut busheling	8.00 to 8.50
Cast iron borings	4.50 to 5.00
Machine shop turnings	5.00 to 5.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	8.50 to 9.00
Stove plates	$ 8.00 to 8.50
Angle splice bars (iron)	10.50 to 11.00
Angle splice bars (steel)	9.50 to 10.00
Cast iron	10.50 to 11.00

Store Prices

CINCINNATI

Steel bars, 1.75c to 1.90c; iron bars, 1.70c to 1.80c; plates and shapes, 1.85c to 2c; sheets, blue annealed, No. 10, 2c to 2.05c; black, No. 28, 2.50c to 2.55c; galvanized, No. 28, 3.50c to 3.55c; cold rolled shafting, round, square, hexagon and flat, 55 to 58 off.

CLEVELAND

Steel bars, 1.80c; plates and shapes, 1.90c; iron bars, 1.85c; sheets, No. 10 blue annealed, 2.15c; No. 28 black, 2.60c; No. 28 galvanized, 3.60c.

CHICAGO

Steel bars, 1.65c; iron bars, 1.65c; hoops, 2.15c; shapes and plates, 1.75c; No. 10 blue annealed sheets, 1.95c; black, No. 28, 2.55c; galvanized, No. 28, 3.60c.

PHILADELPHIA

Steel bars, 1.80c; structural shapes, 1.80c; plates, 1.80c; iron bars, 1.70c.

NEW YORK

Steel bars, 1.90c; structural shapes, 1.95c; plates, 1.95c.

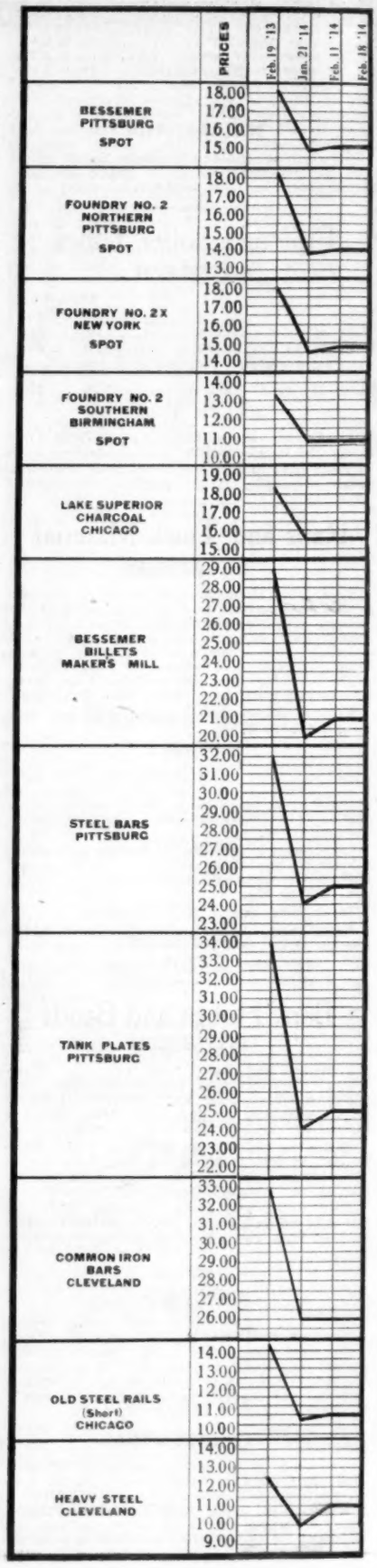
Death of Wm. Strangward

William Strangward, president and general manager of the Forest City Foundry & Mfg. Co., and of the Walworth Run Foundry Co., Cleveland, died at his home in that city Sunday, Feb. 15, aged 66 years, after a long illness. Mr. Strangward started in the foundry business in Cleveland in 1881, when he was associated with Andrew Carlin and John Ennis in starting the Viaduct Foundry Co. In 1888 he was associated with Messrs. Carlin and Ennis and others in organizing the Standard Foundry Mfg. Co., with which he was connected for two years. In 1890, with Charles F. Seelbach, he established the Forest City Foundry & Mfg. Co., which, in 1904, purchased the Walworth Run Foundry Co. Mr. Strangward was also a director of the American Range & Foundry Co.

Ralph Albree, 42 years old, treasurer of the Chester B. Albree Iron Works Co., Pittsburgh, died Feb. 16 in New York City from pneumonia. He was the youngest son of the late Joseph Albree, founder of the Albree company. Mr. Albree was born in Allegheny, now known as the Northside, Pittsburgh, and had lived in that city all his life. He became identified with the Albree company after being graduated from Yale in 1894.

William Henry Boardman, for many years president of *The Railroad Gazette* and for eight years its editor, died recently at Ridgefield, Conn., aged 67 years.

PRICE CHART



Storm of Protests Comes from Shippers

When Charges for Spotting Are Proposed—Attorney Brandeis is Amazed — Mr. Patterson Tells About "Idle Dream"

Washington, Feb. 17.—Plans of eastern railroads to file tariffs charging 7½c per ton, or a minimum of $2 per car, for spotting service, are thought to have been forestalled. Regardless of the fact that railroad attorneys at the free allowances hearings before Commissioner Harlan last week attempted to ridicule the idea that such a proposal was under way, it is known that recommendations along those precise lines were drawn up, had even been distributed among shippers, and, further, that the tariffs, according to a prominent and interested railroad attorney, were in course of preparation. The tariffs were to be filed to be effective March 20. It was generally expected by the railroads, however, according to a reliable source, that the tariffs would be suspended pending investigation and hearing.

Tariffs of this kind, if filed, would set a precedent in rate making for America. Such a system does prevail in England, where separate rates are made for the line haul and terminal services.

When the recommendations of the railroads, proposing these tariffs, were distributed among the shippers, it raised a storm of protest, and the matter perhaps saw its end during the free allowances hearings while Attorney Louis D. Brandeis was cross-examining a witness in regard to drayage, wharfage and handling charges at warehouses in Norfolk, Va. Mr. Brandeis was emphasizing one great point which he has held to tenaciously that free allowances should be abolished because they represent a huge depletion in the revenues of the carriers. The inference is, of course, that the carriers could get a revenue by charging legitimate rates for such services and in consequence would not have to ask for increased freight rates. He was citing various examples where the cost of this free service to the shippers aggregated a material amount in relation to the total revenue. Then Attorney Francis B. James, prominent as shippers' counsel, often appearing for iron and steel interests, interrupted Mr. Brandeis to say that he understood the carriers were preparing to file tariffs calling for 7½c per ton for spotting with a minimum charge of $2 per car. Mr. Brandeis appeared to be bewildered and amazed by the statement, and declared it was the first he had heard of it. Attorney Patterson, of the Pennsylvania lines, in a sarcastic vein, said the report that the carriers were contemplating any such a plan was an "idle dream".

Railroad attorneys themselves, however, who are participating in hearings in connection with the advance case of the eastern railroads, had previously told shippers that railroad traffic men had met in Pittsburgh on Feb. 10 and drew up the recommendations, which were brought to Washington and distributed among some of the many shippers present. It was suggested that the proposal might be discussed during the hearings on free allowances or at a later period. As matters developed, it was shown that the temper of the shippers was adverse to such tariffs because of the alleged excessive charges, and nothing has been done about the plan.

The so-called 5 per cent advance tariffs of the eastern railroads, which were suspended until March 20, the time limit of 120 days for the first suspension, will, of course, have to be suspended again. There is no possible chance of the hearings from various shippers being concluded by that time, much less would the commission have time to go over the tremendous mass of data which has been submitted. The free allowances hearings, which closed last Saturday, will be continued at a future date yet to be determined upon. It is not known whether suggestions of shippers that the free allowances hearings be held in different cities will be acted upon or not. It is believed, however, that they will be confined to Washington. The commission had hoped to clear up the matter of hearings on free allowances during the discussion of three days of last week, but numerous shippers protested that they wanted to be heard and Commissioner Harlan assured them that they would be granted the privilege.

Richard H. Jones Jr., representing the independent steel companies of the Mahoning and Shenango valleys of Ohio and Pennsylvania, respectively, was the only iron and steel representative who had an opportunity to give an expression, and it was brief. He said that, if the commission proposes to go further into the matter of spotting service, it would profit by making personal inspection of conditions in the valleys where 75,000 cars move in and out each month. The iron and steel interests were especially opposed to the proposed spotting tariff rates. It was pointed out, for instance, that, as the average carload of iron and steel products weighs 18 tons, the average cost for spotting would be slightly more than 11c per ton for steel interests. The average carload of structurals, on the other hand, weighs 40 tons and with spotting at 7½c per ton the cost would be $3 per car.

Big shippers who testified at the free allowance hearings generally laid stress on the fact that they had furnished the facilities for expediting and decreasing the cost of shipping, that the investments were big, that small shippers were aided in various ways by reason of these facilities and that benefits ought to accrue to shippers furnishing such facilities. It was argued that it did not create discrimination, and at the same time the shippers declared they were ready to pay their share of any extra service accorded by the railroads provided an equitable adjustment could be arranged. The problems involved have opened avenues of such immense proportions that they for the time being overshadowed the regular hearings as to proposed increase in freight rates.

Buys Diamond State Plant

Daniel J. Driscoll, of the Delaware Seamless Tube Co., Auburn, Pa., was the highest bidder at the trustees' public sale, last week, of the Diamond State Steel Co. plant, at Wilmington, Del. His bid was $208,000 and was reached after some spirited competition, as the sale was largely attended. Confirmation of the sale has been asked from the courts. The property consists of slightly more than 53 acres of ground with wharves on tidewater and directly connected with the tracks of the Pennsylvania, Baltimore & Ohio and Reading railroads. The manufacturing equipment consists of four basic and one acid 50-ton open-hearth furnaces and 34-inch blooming mill, one single puddling, 10 double puddling and nine heating furnaces and eight trains of rolls. Mr. Driscoll, it is understood, bid in the plant as an individual.

At the annual meeting of the Reading Iron Co., the retiring directors were re-elected.

Table I.

RESULTS OF REMELTS.

Original Iron. Cast No.	Kind.	Remelt No.	Breaking Strength pounds. 1.25-in. Round bar.	2-in. Square bar.	Total Carbon per cent	Graphitic Carbon per cent.	Combined Carbon per cent.	Silicon per cent.	Manganese per cent.	Phosphorus per cent.	Sulphur per cent.	Nitrogen per cent.	Oxygen per cent.	Micrograph. Fig. No.	Fracture.
			3,000												
A	Soft 1	.....	3,350	.....	4.00	3.22	0.78	1.90	0.62	0.139	0.017	0.006	0.027	1 & 2	Close grain for grade.
			3,150	16,000	4.03	3.40	0.65	Sample taken from 2-in. bar.							
A	Soft 1	R. 291	3,200	15,900	4.05	3.05	1.00	Sample taken from 1-in. bar.				.....		5 & 6	.....
			2,500												
B	Spl. 1	.....	2,900	.....	4.09	3.43	0.66	1.88	0.70	0.112	0.020	0.0030	0.009	3 & 4	Very open, low chill.
			2,600	13,000	4.08	3.30	0.78	Sample taken from 2-in. bar.							
B	Spl. 1	R. 292	2,700	13,900	4.08	3.29	0.79	Sample taken from 1-in. bar.				.....		7 & 8	.....
			3,400												
C	High 2	.....	3,500	.....	4.00	3.05	0.95	1.00	0.46	.....			0.038	9 & 10	Close grain, 1/4-in. chill.
			3,800	16,000	3.96	3.00	0.96	Sample taken from 2-in. bar.				.....		13 & 14	.....
C	High 2	R. 297	3,700	15,000	3.96	2.96	1.00	Sample taken from 1-in. bar.				.....		13 & 14	.....
			2,400												
D	High 2	.....	2,900	.....	4.05	3.15	0.90	1.00	0.50	.....			0.009	11 & 12	Open grain, no chill.
			3,000	14,900	4.13	3.00	1.13	Sample taken from 2-in. bar.							
D	High 2	R. 298	2,800	12,000	4.13	3.16	0.97	Sample taken from 1-in. bar.				.....		15 & 16	.....
			3,500												Very close grain, 0.25-in.
E	Med. 3	.....	4,200	.....	4.10	3.50	0.60	0.70	0.60	0.128	0.035	.....	0.0065	17 & 18	chill.
				19,300											
E	Med. 3	R. 301	4,150	20,800	4.10	2.90	1.20	Sample taken from 2-in. bar.				.....		21 & 22	.....
F	Med. 3	.....	2,500	.....	4.49	3.60	0.89	0.72	0.59	0.108	0.024	.....	0.009	19 & 20	Open grain, 1/4-in. chill.
				10,900											
F	Med. 3	R. 302	2,750	12,900	4.49	3.20	1.39	Sample taken from 2-in. bar.				.....		23 & 24	.....

Effect of Oxygen on Quality of Cast Iron

(*Continued from page 370*)

in getting a complete set of perfect bars. There is also, of course, a variation to be expected in these bars on account of the nature of the material and on account of their being industrial rather than laboratory or refined tests.

Results of Remelts

We repeated many times the experiment of remelting normal or even very poor ("spotted") irons, with spongy No. 6, and with the same result in every instance, an improvement in the strength up to 50 per cent or more.

We give, in Table I, a summary of the results on the three pairs of remelts mentioned earlier, which shows their chemical composition and also the strength of the original iron and of the remelts.

It will be seen that in every case those irons which were strong as they came from the furnace retained their superiority after remelting. It will also be seen that the good iron was in each case much higher in oxygen than the corresponding poor iron. To summarize, therefore, we consider that we have proved the following facts:

1.—Strong, tough irons of high chilling qualities contain oxygen in appreciable quantities. Weaker irons of similar analysis contain less or no oxygen.

2.—Poor and normal irons may be improved beyond recognition by introducing oxygen into them.

Experiments on Deoxidation

As an additional proof that the actual cause of the increased strength of the strong irons was oxygen, we thought it would be well to try the effect of deoxidizing some of these strong irons with recognized agents used for that purpose. We accordingly made various remelts of strong irons which we deoxidized in the crucible immediately before pouring with aluminum in several cases and with titanium in one or two. The results are shown in Table II. The results of the first trials are given by Nos. R 278, R 303, R 279 and R 304. They did not seem to us as conclusive as they

Table II.

RESULTS OF TREATMENT WITH ALUMINUM AND TITANIUM.

Original Iron. Cast No.	Kind.	Remelt No.	Treated With	Breaking strength pounds 1.25-in. Round Bars.	2-in. Square Bars.	1-in. Square Bars.	Total Carb'n per cent.	Graphitic Carb'n per cent.	Combined Carb'n per cent.	Silicon per cent.	Manganese per cent.	Phosphorus per cent.	Sulphur per cent.	Nitrogen per cent.	Oxygen per cent.	Fracture.
G	Low 2	.....		3,450	20,800	.....	3.77	2.83	0.94	1.17	0.30	0.140	0.020	0.0040	0.048	.....
				3,550												
G	Low 2	R. 277	.....	3,450	20,000	3,500	.....									1/4-in. chill, close top and bottom, dark color, very good fracture.
					17,800											1/4-in. chill, close grain top and
G	Low 2	R. 278	Aluminum	3,500	14,800	.....	3.80	3.00	0.80	.....					0.012	bottom, open center.
G	Low 2	.....		3,450	.....	.....	3.77	2.83	0.94	1.17	0.30	0.140	0.020	0.0040	0.048	No chill, center rather open grain, dark color fracture.
				4,900												
G	Low 2	R. 279	Titanium	3,900	23,900	.....	3.73	2.88	0.85	.....					0.018	.....
				3,500												
E	Med. 3	.....		4,200	.....	.....	4.10	3.50	0.60	0.70	0.60	0.128	0.035	.....	0.065	.....
				3,800	21,700	2,600										
E	Med. 3	R. 303	Aluminum	3,200	21,600	2,850	.....									.....
				3,500												
E	Med. 3	.....		4,200	.....	.....	4.10	3.50	0.60	0.70	0.60	0.128	0.035	.....	0.065	.....
				4,000	18,800											
E	Med. 3	R. 306	Aluminum	4,000	18,800	.....	.....								0.021	.....
				3,400												
C	High 2	.....		3,500	.....	.....	4.00	3.05	0.95	1.00	0.46	.....			0.038	.....
				3,800	16,000		3.96	3.00	0.96	Sample taken from 2-in. bar						.....
C	High 2	R. 297		3,700	15,900	.....	3.96	2.96	1.00	Sample taken from 1-in. bar						.....
					18,000											
C	High 2	R. 305	Aluminum	3,700	16,000	.....	.....								0.018	.....
				3,500												
E	Med. 3	.....		4,200	.....	.....	4.10	3.50	0.60	0.70	0.60	0.128	0.035	.....	0.065	.....
					16,200											
E	Med. 3	R. 304	Titanium	3,800	17,900	2,650	.....									.....

should be and we came to the conclusion that the aluminum in particular, on account of its being so much lighter than the iron and in the form of fine shot, could not be properly mixed with the contents of the ladle to secure the desired result. We therefore made two additional remelts, R 305 and R 306, in which we used a piece of scrap aluminum, weighing about 1 ounce for each crucible holding 50 pounds of iron. This scrap aluminum was securely fastened to the end of a slender iron rod. It was thrust down to the bottom of the molten iron in the crucible and stirred around until all the aluminum was gone. The results in this case were decidedly more conclusive, as will be seen by the last two comparative lines in the table, but even in this case the iron was not as weak as normal irons. We therefore determined the oxygen in the test bars and found it to be 0.018 per cent in R 305, and 0.021 per cent in R 306, thus showing that in spite of this drastic treatment the oxygen was not completely removed and accounting for the comparatively high strength of the iron even after the deoxidizing treatment.

The resutls with titanium are confirmatory of the results with the aluminum. The strong irons deoxidized with about 1 ounce of 10 per cent ferro-titanium per 50-pound crucible were greatly weakened.

We believe that these results may be taken as a final and conclusive proof that oxygen in some form not known or understood by us is accountable for the abnormal strength of irons whose analysis as regards other elements is normal.

As to the condition in which this oxygen exists, we know nothing. We have been unable to detect it with the microscope, and we can only assume that it is some oxide of very much lower degree than any with which we are familiar.

Its effects seem to be two-fold:

1.—It makes the iron very much more sensitive to chilling influences. One of these good irons if cooled normally will be only slightly harder than a normal iron, and on account of its fine, close grain will machine beautifully, but if the surface be chilled even slightly it begins to whiten up, and with a chill of any strength will be solid white at the edge, where a normal iron of the same silicon would show little chill, or none at all.

2. The other principal effect is shown by Figs. 1 to 24, and consists in the extremely fine subdivision of the graphite in the strong irons, contrasting conspicuously with the large, coarse aggregates of graphite in the weak irons. Comparing these photographs of strong irons with those of malleable iron cast white and graphitized by annealing, one is struck with the resemblance, and it is easy to suppose that the effect of oxygen is to raise the solidifying point of the iron relative to the temperature of evolution of the graphite so that the latter, instead of being free in the liquid mass to assume as bulky a form as it chooses, can only form against great pressure and must therefore form in the most compact particles possible, which, in turn cannot coalesce into larger masses because of the resistance of the surrounding medium. These are purely scientific points outside the field of a commercial investigation, and beyond our power to investigate.

High Oxygen and Malleable Irons Compared

Returning for a moment to the resemblance of these high oxygen irons to malleable, it may well be that this resemblance is more than accidental. The best malleable iron is made in the air furnace rather than in the cupola, and in the air furnace the conditions are entirely oxidizing, while in the cupola they are very largely reducing. A bath of white iron low in silicon at a low temperature in the oxidizing atmosphere of an air furnace might easily be capable of absorbing a certain amount of oxygen, which would tend to give a good, strong white iron casting before malleablizing.

It is a matter of common knowledge that good charcoal iron makes a far better raw material for the production of malleable castings than coke iron. On the other hand, there has been much trouble in the malleable industry from attempts to use spotted charcoal irons. These are irons which are made under conditions tending not only to super-carburization, but to thorough deoxidation, which, in fact, analysis proves to take place.

Considering all these circumstances, it seems at least possible that good malleable castings are most easily made from high-oxygen charcoal irons, because the oxygen has the tendency to throw the carbon into the combined condition, and, therefore, give the necessary chill to iron high enough in silica to be "live", at the same time throwing any graphite which may form in the original casting into the nodular form, the same as that into which it is forced by annealing.

The use of the air furnace does not completely replace the best grades of charcoal iron because its conditions are less favorable to the absorption of a large quantity of oxygen than the conditions in the hearth of a relatively cold blast furnace, which receives a certain amount of incompletely reduced iron sponge in the virtual absence of silicon, whose presence would prevent its absorption by the bath.

Associated Foundries of Cincinnati

The Associated Foundries of Cincinnati held their annual meeting at the Business Men's Club, that city, on Feb. 12. A. W. Williamson, of the Peck-Williamson Co., the retiring president, presided as toastmaster following a banquet, and addresses were made by Louis Gilbert, of the Buckeye Foundry Co.; George Lewis, of the Laidlaw-Dunn-Gordon Co., and E. R. Knight, of the Bullock Electric Mfg. Co., all of Cincinnati. Reports were submitted which showed the association to be in a flourishing condition. The following officers were elected for the ensuing year: President, E. T. Pardee, of the Bullock Electric Mfg. Co.; vice president, William Goodman, of the Laidlaw-Dunn-Gordon Co.; treasurer, S. Blackburn, of the Morris Foundry Co., and secretary, W. Geier, of the Modern Foundry Co., all of Cincinnati.

Safety Applied to Grinding Wheels

R. H. Williams, of the safety department of The Norton Co., Worcester, Mass., entertained the members of the Chicago Foundrymen's Club, Saturday evening, Feb. 14, with an interesting illustrated lecture on "Safety as Applied to Grinding Wheels". The lantern slides showed numerous examples of wheel breakages. The Norton Co. has conducted a series of tests on grinding wheels which indicates that safety collars used in connection with taper wheels do not afford sufficient protection and the use of a suitable protection hood is recommended. Tests are now being conducted on the unit breaking stresses of grinding wheels of different forms. The meeting was held at the Sherman hotel and as usual was preceded by an informal dinner.

Pope Mill Resumes

The Pope mill of the Phillips Sheet & Tin Plate Co., Steubenville, O., idle since last July, has renewed operations. Five of the 12 mills went on last Monday. A strike was declared July 1 last, when open shop policies were adopted by owners of the mill.

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An Impartial Service

An interesting side light on the broadminded policy of the management of the United States Steel Corporation is furnished by the testimony of W. A. MacGonagle, president of the Duluth, Missabe & Northern railway in the dissolution suit hearings last week at New York. The Duluth, Missabe & Northern is one of the principal ore carrying railroads of the Minnesota iron district and is owned by the Steel Corporation. Mr. MacGonagle said it is the policy of his road to give better service, if possible, to the independent companies' mines than to the Steel Corporation and that Rogers Brown & Co., Oglebay, Norton & Co., and other independents prefer to have the services of the Corporation road rather than that of its competitors. That the Steel Corporation railroads are more consistently interested in the general development of the Minnesota ranges than some of the other transportation agencies, is a matter of common knowledge in the ore country.

A reference to the annual iron ore reviews published in the first January issue of THE IRON TRADE REVIEW each year will show that this policy is not a recent development. In our review, published Jan. 4, 1912, is the following paragraph: "A decision handed down during the year by Judge Sanborn, permitted the railroads operating in the state of Minnesota to raise their passenger rate to three cents a mile. The Great Northern, Northern Pacific, and Soo line, all of which reach portions of the Minnesota iron ranges, took advantage of this ruling and placed the higher rates in effect. The railroads controlled by the Steel Corporation have not changed their passenger tariffs and are still carrying passengers at two cents a mile. This action has made a very favorable impression throughout the iron range country."

A year later, in our review published Jan. 2, 1913, appears the following comment regarding car service to the various mines: "Car shortages contributed to the difficulties of the operators and early in the year, particularly, it was next to impossible to get satisfactory car service from the Great Northern, but conditions improved as the season advanced. On account of the constantly growing number of mines, the number of cars required for a given tonnage is increasing."

These statements, which were published after a careful personal investigation of conditions by a staff representative of THE IRON TRADE REVIEW, simply serve to reinforce Mr. MacGonagle's testimony. It is probably true that a large portion of the independent mining development in Minnesota is due to the efficient and impartial services rendered by ore carrying railroads controlled by the Steel Corporation.

Statistics Put to the Test

The only sufficient test to be applied to statistics is that of accuracy. Inaccurate records are worse than none, as their influence is misleading.

Until attacked last month, THE IRON TRADE REVIEW has never seen occasion to defend its statistical records, as their high standing in the iron and steel trade was too well known to need emphasis.

In the two most important branches of the iron industry, that of ore shipments and pig iron production THE IRON TRADE REVIEW has presented timely and accurate reports. In the case of annual ore shipments, we have the field alone. In the second, *The Iron Age* also publishes monthly records of pig iron output.

In a fulsome, but futile attempt to refute the "million-idle-men" article, published in *The Daily Iron Trade*, of Jan. 9, our New York contemporary took occasion to remark that "The most seriously misleading feature of the exhibit was the inclusion of fully 20 modern furnaces of steel companies—furnaces which were known to be banked over the holidays."

And another New York publication, whose name it would take an effort to recall, as it does not have the organization or prestige to collect the blast furnace figures, agreed with *The Iron Age*, and through its Pittsburgh correspondent stated that "With us it was given no credence, as Pittsburgh knows better."

The direct reference in the articles quoted was, of course, the story in *The Daily Iron Trade*. While independently compiled, that article was based, to a certain degree, upon pig iron records collected by THE IRON TRADE REVIEW. And the statement about 20 idle blast furnaces, made by *The Iron Age*, was an attempt to show why there was a variance in the published records of active stacks on Dec. 31.

Now, let us see what this one-man "Pittsburgh"

and our New York contemporary really did know.

THE IRON TRADE REVIEW stated, Jan. 8, that there were 191 active blast furnaces on Dec. 31, 1913. *The Iron Age,* on the same date, said 212 furnaces. And now comes the bureau of statistics of the American Iron and Steel Institute, the final authority, which all recognize, and says the active stacks on that date numbered 188.

THE IRON TRADE REVIEW and *The Iron Age* are the only sources of monthly pig iron statistics, and their returns are received from the same furnace owners. In adding these reports, the New York paper arrived at 212, while we could find only 191.

Our variation from the official figures was 3, or 1.6 per cent.

The Age's variation was 24, or 12.7 per cent.

And yet our records were "seriously misleading".

Let us continue the effort to find whose records are "misleading".

The bureau shows a total production in 1913 of 30,626,320 tons of coke and anthracite pig iron. THE IRON TRADE REVIEW reported 30,652,767 tons, a difference of 26,447 tons. And it had the faith in its own work to add up its monthly reports and tell the iron world what the 1913 output was, confident that any variation from the official figures would be inconsequential.

The Iron Age, which so lightly regards its monthly figures that it does not add them at the end of the year, showed an annual production of 30,724,101 tons, a difference of 97,781 tons.

Our variation from the official figures, due to the rapidity with which the returns are forwarded to us, was only 2,000 tons a month. Our New York critic was 8,000 tons a month away from the exact figures.

When attacking our records, a dancing teacher would advise this individualistic "Pittsburgh", and our New York contemporary—

To learn to "hesitate".

Some Features of the Coke Market

The market for standard Connellsville coke, which has remained practically stationary since the latter part of October, is not expected to change its position to any great extent until increased pig iron demand necessitates the blowing-in of additional merchant blast furnaces. Several stacks, owned by steel companies which consume all the metal they produce, have renewed operations since Jan. 1, but the so-called non-merchant furnaces, with few exceptions, are not dependent upon the open market for fuel, and, as a result, coke operators have not been benefited by slightly increased blast furnace operations. The market will respond quickly, however, just as soon as merchant furnaces come into blast, and it is not improbable that prices will advance. Coke operators already have begun to prepare for better conditions, withdrawing quotations extending over long periods of delivery, in order to benefit from any improvement that may take place. Activity in the pig iron market the last few weeks, extending over practically the entire country, has led coke operators to believe that more nearly normal conditions are in sight, and that the coke market will be directly benefited unless a sudden reversal occurs in other branches of the trade.

Ever since pig iron prices started to decline about a year ago, much has been heard, especially through the medium of the trade press, about the "unreasonable" price of coke. Some consumers have complained bitterly, and, rather than pay the asking price for strictly standard Connellsville coke, have bought fuel of inferior quality; other consumers have expressed the hope that the coke market would hold its own, believing that the pig iron market might be benefited as a result. Coke prices have been high for at least six months, when compared with the selling price of pig iron. On the other hand, coke prices the last six months have not been high, when compared with prices ruling in past years. The average price of spot blast furnace coke the last 14 years, according to minimum quotations offered each week by THE IRON TRADE REVIEW, is $2.26 a ton at the ovens; the average price of spot furnace coke the last six months is $2.03 a ton at the ovens, or 23 cents a ton less than the average price since 1900. The average monthly price of basic pig iron, based on actual sales of 1,000 tons or more, since 1906, is $15.81 a ton at the furnace, in the valley district; the average monthly price of basic pig iron the last six months, based on actual sales, is $13.46 a ton at valley furnaces, or $2.35 a ton less than the average monthly price for a period of eight years. When comparing coke and pig iron prices over a period of years, an analysis of averages appears to give coke operators the better of the argument. Price tables, however, do not indicate at what figures the bulk of the tonnage involved, whether pig iron or coke, was sold, and, for that reason, do not tell a complete story. Coke operators, the last six or eight months, have done everything in their power to prevent a complete demoralization of the market, and in that respect have been more successful than blast furnace managers, many of whom sold tonnage at losses. Coke operators contend, and justly so, to a great extent, that the price of their product should not be regulated by the price of pig iron, and this standard of basing coke prices, which was rather general not many years ago, is rapidly disappearing. Some students of the trade contend that the price of coke should be estimated upon the market value of the coal from which it is made, but, as the *Connellsville Courier* points out in a recent issue, opinion as to the proper price of coke depends largely upon the view point.

Professor Jenks is a learned gentleman, but, it seems to us, is hardly able to qualify as an expert on trade journalism. His statement at the hearing in the Steel Corporation dissolution suit, that trade paper quotations "do not represent the actual buying and selling prices, but simply the general trend of prices, and more frequently, perhaps, the general asking price of some of the leading sellers", shows that even a learned professor will talk sometimes about things concerning which he has very little knowledge.

Charges Railroads "Juggled" the Ore Adjustment

Attorney for Independent Steel Companies Causes Commotion

Examiner Gerry Refuses to Order Offensive Word Stricken from Record—Emphatic Protests Against Advancing Freight Rates

Washington, Feb. 17.—Pointed statements, supported by figures, have been submitted to Examiner Gerry of the Interstate Commerce Commission to show that the iron and steel trade is already bearing more than its share in providing revenues for carriers in official classification territory, which are seeking a general advance in freight rates. The protests by the iron and steel interests, representing great consuming and producing districts, were emphatic, yet at the same time there was a prevailing tendency on the part of the protestants to yield everything within the limits of fairness to the railroads. But it was the common expression that the carriers have not, as the law requires, proved their case so far—that is, they have not assumed and disposed of the burden of proof showing why specific rates on iron and steel articles and low grade commodities entering into their manufacture should carry higher rates than those prevailing. As a matter of fact, cases are now awaiting decision by the commission in which opposition was made to many existing rates.

Protests Made

Protests made by the iron and steel men and those immediately associated with the trade include the following:

Alan Wood Iron & Steel Co. and four companies of the Schuylkill and Lehigh valleys of Pennsylvania, and Oxford Furnace, N. J., protested against increases in rates on coke from Connellsville, Latrobe, Klondike and West Virginia regions. W. T. Worth, treasurer of the Worth Bros. Co., Coatesville, Pa., in testifying, also opposed increase in rates on finished products, outbound, as well as raw materials, inbound.

Pittsburgh Steel Co., Pittsburgh, opposed increase on ore rates from lower Lake Erie ports to Pittsburgh district, and advanced rates on finished and semi-finished products of all kinds moving out of Pittsburgh. Submitted petitions only, having previously filed complaint against the 88-cent ore rate, and having a case pending decision as to rates on finished and semi-finished products.

Republic Iron & Steel Co., Youngstown Sheet & Tube Co., Brier Hill Steel Co., Youngstown O.; Shenango Furnace Co., Sharon, Pa., and 13 other independent companies of Mahoning and Shenango valleys of Ohio and Pennsylvania, respectively, protested against increase in rates of all materials entering into manufacture of pig iron, coal, coke, ore and limestone. Submitted nine months ago their cases protesting against existing rates on coal from Pittsburgh and ore from lower Lake Erie ports, but no decision yet made. Coke rate from Connellsville, which was object of hearing, was reduced by decision last May from $1.35 to $1.20.

Carrying Costs

"The increase in cost of operation of the railroads in official classification territory, which is given as a ground for increased revenue, applies in all its parts to the class freight, but does not apply in anything like the same extent to finished and semi-finished iron and steel products, and, so far as it does apply, is more than offset by the economies in the transportation of such commodities, due to the increased facilities and improvements in the equipment; so that commodities such as finished and semi-finished steel products moving in carload lots, are being carried at decreased cost per unit, and not at increased cost."—Extract from Pittsburgh Steel Co. petition, submitted at hearing by Attorney Challen B. Ellis.

Jones & Laughlin Steel Co., Pittsburgh, protested against increase in rates on semi-finished and finished products moving east and west of Pittsburgh.

Ontario Iron Ore Co., Ontario, N. Y., protested against increase on ore rates to Earlston, Saxton, Riddlesburg, Pa., from $1.60 to $1.68; and to Emporium, Pa., from $1.10 to $1.15. Attorney Frank E. Young said the rate on ore from Ontario to those furnace points represents a greater rate per ton mile than from other mines anywhere.

The only witnesses placed on the stand were representatives of the Schuylkill and Lehigh valley interests and included L. N. Moon, traffic manager of the Alan Wood Iron & Steel Co.; J. S. Stillman, secretary and treasurer of the Empire Iron & Steel Co., Catasauqua, and W. T. Worth. Attorney William A. Glasgow Jr. represented these companies.

In addition to evidence offered by the witnesses, there was a huge mass of data by way of maps, tables, records, etc., incorporated to support the contentions of the iron and steel protestants.

Unfavorable Conditions

Mr. Moon, in order to show that eastern furnaces generally are less able to stand any increase in rates on coke than at any time within the last 20 years, said prices of that commodity, except for the early part of 1913, were higher during the last 14 years than they were previous to that period. Attorney O. E. Butterfield, representing the railroads, made a futile attempt to get Mr. Moon to admit that, assuming there were no inequalities, or that, if any, they had been removed, the scheme of the carriers in proposing an increase in coke rates is reasonable. An effort was made to have Mr. Moon agree that, inasmuch as 90 per cent of the tonnage comes from the Connellsville region, it was proper to add 5 per cent to the Connellsville rate and then impose the regional differentials. Mr. Moon finally volunteered that the people he represents would not oppose an increase after the unfavorable conditions were removed. He insisted, however, that they wanted to see them removed before assenting to any increase.

In reply to a question by Mr. Glasgow as to whether now is an auspicious or inauspicious time for increasing rates, Mr. Stillman said trade conditions are unfavorable. It was asserted that competition from the lake region and Alabama has increased and that the tendency of tariff legislation has been to restrict prices, although the lowered tariff has not brought in many imports.

"Our wage cost is the highest

ever known," said Mr. Stillman, "and conditions less favorable than they have been in 15 years. Our production is 50 per cent of the capacity and only 38 per cent of the furnaces are in blast."

Mr. Worth, in protesting against increases in rates on raw materials and finished products, said that eastern furnacemen have been at a disadvantage in comparison with the Pittsburgh furnacemen for so many years that even if inequalities are removed now, the eastern furnacemen will not be on an equality. He declared the western Pennsylvania mills have been getting allowances which the eastern interests have never been able to obtain.

"For 11 months past," said Mr. Worth, turning to another point, "we have been suffering in the general depression. The railroads have also suffered, but I think we have suffered more than they have. We are not opposed to an increase in rates except for the reason that any increase now would emphasize our disadvantages and the inequalities would be magnified."

Pittsburgh Steel Co.'s Position

Because the Pittsburgh Steel Co.'s protest against rates on finished and semi-finished products is pending decision and also on account of the fact that it has filed a complaint against the 88-cent ore rate and the further fact that an investigation is being made by the commission into the ore rate structure in western Pennsylvania, eastern Ohio and the Wheeling district of West Virginia, Attorney Challen B. Ellis, who presented petitions for the Pittsburgh company, said it would be unfair for that company to have to meet the issues as to the reasonableness and discriminatory character of the rates on semi-finished and finished products and iron ore. Further, he said, it would be just and proper not to allow the advances in freight rates now proposed on those articles until the commission can determine the case yet to be decided and the merits of the complaint in the ore rate cases. Ellis & Donaldson, a local law firm of which Mr. Ellis is a member, have also filed on behalf of the Wheeling Steel & Iron Co., Wheeling, a complaint against the 88-cent ore rate, which applies to Wheeling also. The Wheeling company did not appear at the hearing last week, perhaps partly on account of the pending complaint.

Points brought out by Mr. Ellis for the Pittsburgh Steel Co., and Attorney George C. Wilson for the Jones & Laughlin Steel Co., were similar in many respects. It was contended that in proportion to the cost of transportation, semi-finished and finished products all make for low cost of transportation per ton. Further, it was said, in proportion to the cost of transportation, these commodities are being charged considerably higher than the class freight and are thus discriminated against in the adjustment of rates between class freight and carload traffic.

"While rates upon class freight have remained practically stationary for 30 or 40 years," said Mr. Ellis, "the rates on finished and semi-finished steel products have, within the past 10 or 12 years, borne increases in amounts ranging from 10 to 15 per cent. Representatives of the carriers have themselves insisted in the hearings upon proposed advances of freight rates in 1910 before this commission, that certain carload freight, including iron and steel products, had already borne its fair share of the advance in freight rates, and that a proper adjustment of rates as between the various kinds of freight would be brought about by an increase in the rates on class freight, without any further increase in the rates on such commodities as finished and semi-finished iron and steel products."

Attorney Wilson for the Jones & Laughlin company brought out many additional cogent points in his attack on increase in rates on semi-finished and finished products.

In referring to the 88-cent ore rate, Mr. Ellis said that it already yields an undue profit, and offered many statements to support his contentions.

Attorney Richard Jones Jr., representing the independent steel companies of the valleys, was vigorous in his denunciation of the railroads for attempting to increase rates to the valleys on coal, coke, ore and limestone. Regarding the ore adjustments of last summer, he said the railroads had returned to their old practice of basing rates on the theory of the assembling cost of a ton of pig iron, which had been condemned by the commission. He asserted that the carriers had "juggled" the ore adjustment. Objection to the word "juggled" was made by Attorney Butterfield, who asked that it be stricken from the record, but Mr. Jones was firm and would not consent to its being stricken out, after Examiner Gerry refused to order such action.

Profits on those low grade commodities were declared by Mr. Jones to be excessive. He went into detail to show revenues made by the carriers. The profits on limestone, it was declared, are the greatest of all. It is proposed to increase this rate from 35 cents to 40 cents an advance of 14.2 per cent. Mr. Jones said that it is proposed to attack the 35c rate itself, let alone an increase.

He laid considerable emphasis on the fact that the independent steel companies of the valleys have not received any more allowances by way of terminal and spotting service than the general public, and he argued that, if the commission proposed to take them away, it certainly ought not to allow increases in rates.

Large Contract for Asbestos Roofing

The Ohio Painting & Sheeting Co., whose offices are at 25 Wade building, Cleveland, has received the contract for placing the asbestos roofing on the Corrigan-McKinney steel plant, Cleveland. The American Bridge Co. is erecting the open-hearth building and the H. W. Johns-Manville Co. will furnish the roofing. It is estimated that there will be about 10,000 squares to put on. The open-hearth building will be ready in about 10 days and the Ohio Painting & Sheeting Co. will start the work. The company has been a large erector of sheeting and roofing, as well as painting of structural steel work, for a number of years, and obtained the Corrigan-McKinney contract in competition with many other bidders.

Adds New Department

The Detroit Steel Casting Co., Detroit, which manufactured heavy open-hearth steel castings almost exclusively heretofore, recently added a new department devoted to the manufacture of steel castings less than 25 pounds in weight. A side-blow converter has been installed for the production of light castings, and this converter, in conjunction with the open-hearth furnaces, insures flexibility of operation and permits of the disposal of the re-melt, from the small castings, in the open-hearth furnace, thereby insuring the use of high grade new material in the manufacture of small, intricate work. Steel castings of any analysis will be made from converter steel.

There has been a reorganization of the Hercules Electric Co., Indianapolis, under the same name, and the new organization has been incorporated with $25,000 capital stock. Those interested in the concern are S. H. Kurtz, C. D. Meier, John H. Holliday, Albert Baker and Katharine Blake Kurtz. The company manufactures electrical appliances for automobiles and other electrical equipment.

COMPLETE RECORD

Of Pig Iron Production Given by Institute Bureau.

The country's pig iron production in 1913, according to the Bureau of Statistics of the American Iron and Steel Institute, was 30,966,301 gross tons, against 29,726,937 tons in 1912, an increase of 1,239,364 tons, or 4.16 per cent. The output was the largest in any calendar year. The following table shows the production of pig iron in half-yearly periods from 1911 to 1913:

Periods.	1913.	1912.	1911.
First half...	16,488,602	14,072,274	11,666,996
Sec. half...	14,477,699	15,654,633	11,982,551
Total	30,966,301	29,726,937	23,649,547

The decline during the last half of 1913, compared with the first six months, was more than 2,000,000 tons, or 12.2 per cent. Pennsylvania showed a decrease of 815,000 tons, Ohio, 191,000 tons, Illinois, 378,000 tons, New York and New Jersey, 200,000, and Alabama 98,000 tons.

Pennsylvania, as usual, ranked first of the producing states, its percentage being 41.84. Ohio was second with 23.02 per cent, Illinois third with 9.45 per cent, New York and New Jersey fourth with 7.06 per cent, and Alabama fifth with 6.65 per cent.

The production classified according to the fuel used is shown in the tables on the opposite page. The maximum production of pig iron made with coke and bituminous coal and coke mixed, was reached in 1913, when 30,348,973 tons were made. The anthracite record was set in 1890, with 2,186,411 tons, while the charcoal record was also reached in the same year with 628,145 tons.

The production of Bessemer and low-phosphorus pig iron in 1913 was 11,593,385 tons, against 11,664,015 tons in 1912, a decrease of 0.6 per cent. The output of Bessemer pig iron alone last year was 11,276,567 tons, against 11,381,656 tons in 1912. The Bessemer pig iron record was reached in 1906, with 13,611,749 tons.

The production of basic pig iron in 1913 was 12,537,746 tons, against 11,417,886 tons in 1912, an increase of 9.8 per cent. The output established a new record.

The production of spiegeleisen and ferro-manganese last year was 229,834 tons, against 221,724 tons in 1912. Of ferro-manganese alone, 119,496 tons were made, while 110,338 tons of spiegeleisen were produced.

The number of furnaces in blast on Dec. 31 was 205, including 183 bituminous coal and coke, 5 anthracite and 17 charcoal stacks. These figures show a loss from Dec. 31, 1912, of 108 furnaces, and from June 30, 1913, of 99 furnaces. These figures confirm the table published in THE IRON TRADE REVIEW, Jan. 8, which showed 191 stacks active on the last day of the year.

Five new furnaces were built during 1913, including two coke stacks in Pennsylvania with an annual capacity of 360,000 tons, one coke stack in Ohio, with an annual capacity of 182,500 tons, one coke stack in Virginia with an annual capacity of 50,000 tons, and a small charcoal furnace in Mississippi with an annual capacity of 3,500 tons. Three new furnaces were being built on Dec. 31, including one in Pennsylvania and two in Minnesota. Eight stacks were being rebuilt on that date. Ten blast furnaces were abandoned or dismantled during the year, including four in Pennsylvania, two in Virginia and one each in New York, Tennessee, Ohio and Michigan.

RATES ON SCRAP

Will Receive Attention of Western Iron and Steel Association.

Efforts to obtain more equitable freight rates on scrap iron and steel in the west will be undertaken by the newly organized Western Scrap Iron and Steel Association. The first regular meeting of the association resulted in establishing a traffic committee of seven to be appointed by the president, three from Chicago and four from outside. This committee will represent the trade at railroad hearings and classification committee meetings and will take care of complaints on freight rates for the benefit of the trade at large.

Complaints have been made that existing rates on scrap in various sections are detrimental to the interest of the trade, and several recent advances are held to be unjust. Members of the association are of the opinion that one of the greatest results from the organization will be protection against unjust freight rates and classifications.

A constitution and by-laws were presented and adopted and 25 applicants were elected to membership.

The next meeting will be held April 21 at the Hotel La Salle.

Richard T. Crane and Charles P. Crane, sons of the late R. T. Crane of the Crane Co., Chicago, plan to expend more than $2,000,000 in carrying out the philanthropic plans of their father. The pensioning of employes of the Crane Co. is being considered.

The construction engineers of the Bethlehem Steel Co. held their first annual banquet at South Bethlehem, Pa., Feb. 19.

URGENT NECESSITY

For Making Investigation of Tracks and Heavy Loads.

Washington, Feb. 17.—Prevalence of rail failures, for which transverse fissures are accountable, is such as to demand inquiry into the conditions which are present and contributory in the formation of such failures, that means may be adopted toward their elimination.

The foregoing is one of numerous cogent conclusions found by James E. Howard, engineer-physicist of the Bureau of Standards, in a report submitted jointly with that of H. W. Belnap, chief inspector of safety appliances of the Interstate Commerce Commission. The report, just made public by the Commission, deals with an accident on the Southern railway, near Oyama, N. C., March 31, 1913, in which the conductor, engineer and fireman of the derailed train, a freight, were killed. It was caused by a broken rail, there being eight breaks.

Mr. Howard also finds, among other things, that the rail displayed a transverse fissure in the head, on the gage side, about 1 inch in diameter; that the initial rupture of the rail was at the fracture containing this transverse fissure, or at an adjacent fracture, the battered condition of which precluded passing judgment upon the bearing which it had in the derailment; that the initial rupture was probably caused by the eastbound train, which passed over the track next before the westbound (wrecked) train; that the wrecked train caused additional lines of rupture and left the track through the opening made by the several fragments of the rail; that the metal of the rail was low in ductility and brittle, as shown by the tests.

The broken rail which caused this accident was manufactured by the Tennessee Coal & Iron Co.; it was 33 feet long, weighed 80 pounds to the yard; was rolled in November, 1904, and laid in the track in January, 1905.

In making comment on Mr. Howard's report, Mr. Belnap says:

"The insidious character of these fissures and their menace to safe travel by rail justify the conclusion reached that there is an absolute necessity of making a complete investigation of track and wheel conditions for the purpose of determining the effect thereon of the recent types of locomotives and cars with their greatly increased wheel loads."

The American Construction Co., Milwaukee, has increased its capital from $12,000 to $25,000.

THE PRODUCTION OF PIG IRON IN THE UNITED STATES IN 1913.

Statistics Collected from the Manufacturers by the Bureau of Statistics of The American Iron and Steel Institute, all in Gross Tons of 2,240 pounds.

Production in the First Half of 1913, 16,488,602 Gross Tons; Second Half of 1913, 14,477,699 Tons; Whole of 1913, 30,966,301 Tons.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES.

States. Gross tons.	Blast Furnaces. In blast June 30, 1913.	Blast Furnaces. December 31, 1913. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1913.	Second half of 1913.	Total for 1913.
Massachusetts	1	1	1	2	8,581	4,229	12,810
Connecticut	2	1	2	3			
New York	20	12	16	28	1,193,450	994,170	2,187,620
New Jersey	2	2	5	7			
Pennsylvania	117	78	83	161	6,885,058	6,060,882	12,954,940
Maryland	3	1	4	5	152,002	137,957	289,959
Virginia	9	8	16	24	192,530	149,285	341,815
Georgia	0	0	4	4	.....	.....	.....
Texas	0	0	4	4			
Alabama	23	23	26	49	1,078,173	979,738	2,057,911
West Virginia	3	1	3	4			
Kentucky	2	1	7	8	165,000	150,731	315,731
Mississippi	0	0	1	1			
Tennessee	8	4	14	18	189,019	91,522	280,541
Ohio	62	40	35	75	3,660,473	3,469,052	7,129,525
Illinois	23	11	15	26	1,653,017	1,274,960	2,927,977
Indiana	10	5	5	10	894,743	881,140	1,775,883
Michigan	9	10	5	15			
Wisconsin	5	4	3	7	222,167	145,159	367,326
Minnesota	1	1	0	1			
Missouri	1	1	1	2			
Colorado	3	1	5	6			
Oregon	0	0	1	1	194,389	129,874	324,263
Washington	0	0	1	1			
California	0	0	0	0			
Total	304	205	257	462	16,488,602	14,477,699	30,966,301

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	20	12	11	23	1,193,450	994,170	2,187,620
New Jersey	2	2	5	7			
Pennsylvania	105	70	65	135	6,678,179	5,994,735	12,672,914
Maryland	3	1	3	4	152,002	137,957	289,959
Virginia	8	7	13	20	191,203	147,372	338,575
Georgia	0	0	2	2			
Texas	0	0	3	3			
Alabama	21	21	24	45	1,061,640	963,821	2,025,461
West Virginia	3	1	3	4	165,000	150,728	315,728
Kentucky	2	1	6	7			
Tennessee	7	4	13	17	188,574	89,632	278,206
Ohio	62	40	33	73	3,659,723	3,467,801	7,127,524
Illinois	23	11	15	26	1,653,017	1,274,960	2,927,977
Indiana	10	5	5	10	945,277	862,383	1,807,660
Michigan	2	3	0	3			
Wisconsin	4	3	3	6			
Minnesota	1	1	0	1			
Missouri	0	0	1	1			
Colorado	3	1	5	6	219,780	157,569	377,349
Washington	0	0	1	1			
California	0	0	0	0			
Total	276	183	211	394	*16,107,845	*14,241,128	*30,348,973

* Include small quantities of pig iron and ferro-alloys made with coke and electricity, etc.

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	3	3	204,575	72,772	277,347
Pennsylvania	8	5	15	20			
Total	8	5	18	23	204,575	72,772	277,347

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	1	1	2	8,581	4,229	12,810
Connecticut	2	1	2	3			
New York	0	0	2	2	2,304	2,375	4,679
Pennsylvania	4	3	3	6			
Maryland	0	0	1	1	1,327	1,913	3,240
Virginia	1	1	3	4			
Alabama	2	2	2	4	16,533	15,917	32,450
Georgia	0	0	2	2	.....	.....	.....
Texas	0	0	1	1			
Kentucky	0	0	1	1	445	1,893	2,338
Tennessee	1	0	1	1			
Mississippi	0	0	1	1			
Ohio	0	0	2	2	750	1,251	2,001
Michigan	7	7	5	12	115,183	108,896	224,079
Wisconsin	1	1	0	1			
Missouri	1	1	0	1	31,059	27,325	58,384
Oregon	0	0	1	1			
California	0	0	0	0			
Total	20	17	28	45	*176,182	163,799	*339,981

* Include small quantities of pig iron and ferro-alloys made with charcoal and electricity.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	276	183	211	394	16,107,845	14,241,128	30,348,973
Anth. & anth. & coke	8	5	18	23	204,575	72,772	277,347
Charcoal	20	17	28	45	176,182	163,799	339,981
Total	304	205	257	462	16,488,602	14,477,699	30,966,301

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

	Districts. Gross tons.	Blast Furnaces. In blast June 30, 1913.	Blast Furnaces. December 31, 1913. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1913.	Second half of 1913.	Total for 1913.
Pennsylvania.	Lehigh Valley	12	9	13	22	580,591	473,095	1,053,686
	Schuylkill "	11	8	10	18	484,257	381,702	865,959
	L. Susq. "	8	6	9	15	372,781	262,298	635,079
	Juniata "	2	2	5	7	80,110	60,063	140,173
	Allegheny Co.	41	24	23	47	3,128,446	2,871,097	5,999,543
	Shenan. Valley	22	11	13	24	1,222,686	1,066,007	2,288,693
	Miscel. bitum.	17	15	7	22	1,013,883	953,245	1,967,128
	Charcoal	4	3	3	6	2,304	2,375	4,679
Ohio.	Mahoning Val.	22	11	14	25	1,512,690	1,475,280	2,987,970
	Hocking "	0	0	1	1	1,142,044	1,085,493	2,227,537
	Lake Counties.	17	12	5	17			
	Miscel. bitum.	13	7	8	15	788,074	679,934	1,468,008
	H. R. bitum.	10	10	5	15	216,915	227,094	444,009
	H. R. charcoal	0	0	2	2	750	1,251	2,001

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	360,813	204,947	565,760
Pennsylvania	2,351,308	2,128,071	4,479,379
Maryland	152,002	137,957	289,959
West Virginia, Kentucky, and Tenn.	156,359	137,486	293,845
Ohio	2,263,949	1,922,754	4,186,703
Illinois, Wisconsin, Colorado, and California	1,001,535	776,204	1,777,739
Total	6,285,966	5,307,419	11,593,385

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania.	Lehigh Valley	120,294	149,678	269,972
	Schuylkill Valley			
	Lower Susquehanna Valley	70,420	42,399	112,819
	Allegheny County	1,314,068	1,165,719	2,479,787
	Shenango Valley	846,526	770,275	1,616,801
	Miscellaneous bituminous			
Ohio.	Mahoning Valley	969,925	890,635	1,871,560
	Lake Counties	707,533	566,939	1,274,472
	Hanging Rock bituminous	575,491	465,180	1,040,671
	Miscellaneous bituminous			

PRODUCTION OF BASIC PIG IRON, INCLUDING CHARCOAL IRON.

New York and New Jersey	264,661	299,691	564,352
Pennsylvania—Allegheny County	1,697,820	1,616,950	3,314,770
" Other counties	1,959,780	1,661,482	3,621,262
Virginia	463,539	367,649	831,188
Alabama			
Ohio	815,900	959,325	1,775,225
Indiana and Illinois	1,162,902	1,004,487	2,167,389
Michigan, Missouri, and Colorado	145,409	118,151	263,560
Total	6,510,011	6,027,735	12,537,746

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	111,243	118,591	229,834
Illinois	.....		
Colorado	.....		
Total	111,243	118,591	229,834

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1909 TO 1913.

States—Gross tons.	Production—(Includes spiegeleisen, ferro-manganese, etc.) 1909.	1910.	1911.	1912.	1913.
Massachusetts	18,388	16,582	9,649	17,366	12,810
Connecticut					
New York	1,733,675	1,938,407	1,562,756	1,939,231	2,187,620
New Jersey	294,474	264,781	40,663	36,876	
Pennsylvania	10,918,824	11,272,323	9,807,073	12,552,131	12,954,940
Maryland	286,856	326,214	255,816	219,546	289,959
Virginia	391,134	444,976	293,642	256,167	341,815
Georgia	26,072	14,725	1,200	.....	
Texas					
Alabama	1,763,617	1,939,147	1,712,211	1,862,681	2,057,911
West Virginia	228,282	174,661	201,472	274,360	
Kentucky	86,371	100,509	95,202	68,760	315,731
Mississippi					
Tennessee	333,845	397,569	324,648	338,238	280,541
Ohio	5,551,545	5,752,112	5,310,506	6,802,493	7,129,525
Illinois	2,467,156	2,675,646	2,108,902	2,887,359	2,927,977
Indiana	964,289	1,250,103	1,163,932	1,770,628	1,775,883
Michigan					
Wisconsin	348,177	307,200	276,807	303,370	367,326
Minnesota					
Missouri					
Colorado	382,766	428,612	395,968	397,731	324,263
Washington					
California					
Total	25,795,471	27,303,567	23,649,547	29,726,937	30,966,301

NET PROFITS

Of Republic in 1913 Were Second Largest in History.

The fourteenth annual report of the Republic Iron & Steel Co., Youngstown, O., for the new fiscal year of the company ending Dec. 31, 1913, showed net profits the second largest in its history, being exceeded only in the "boom" period of 1907. This was notwithstanding the serious flood losses suffered in the first quarter, and to shrinkage during the last quarter, incident to the adjusting of business to new tariff conditions. The total was $3,101,300, after deduction from the gross of $1,654,573 for maintenance and repairs, $5,025,282 for profit sharing under the new system for special compensation, and contingent funds, and $1,923,982 for interest on bonds, exhaustion of minerals, depreciation, and possible shrinkage in value of raw materials. The income account compares as follows:

Net earn.	$4,958,341.84
Int. and divs.	66,940.50
Total profit	$5,025,282.34
Dep., renewal, etc.	600,887.61
Exhaut. fund	241,004.24
Possible shrinkage	220,000.00
Total deduct	$1,061,891.85
Net profits	3,963,390.49
Interest	862,090.43
Prfd. divs.	1,750,000.00
Total deduct	$2,612,090.43
Surplus	1,351,300.06
Prev. surp.	6,661,477.58
Total surplus	$8,012,777.64
Amount appr. for extra deprec.	1,500,000.00
P. & L. surplus	$6,512,777.64
Net prof. applicable to divs.	$3,101,300.06

Chairman John A. Topping's remarks to stockholders follow, in part:

"The satisfactory character of business indicated by the semi-annual report for the period ending June 30, 1913, together with suggested prospects of continued prosperity, were not realized during the last half of the fiscal year; on the contrary, shortly after July, a business recession was in evidence, and during the latter part of August, active liquidation both in values and volume, was under way. Emphasis to this situation was given during October, values and tonnage of new business reflecting a renewed feeling of business disturbance, and lack of confidence, stimulated in part by the discussion and passage of the tariff act on Oct. 3, 1913. This situation was intensified by the discussion and recommendation of other legislation, which, it was feared, would be as radical in character as the tariff bill. With foreign markets upset and in the process of liquidation, and our markets disturbed by domestic matters, earnings and volume of business for the last half of the year naturally declined. Furthermore the unsatisfactory condition of the foundry pig iron market, referred to in the first half of the present fiscal year, continued throughout the year, the last half, however, suffering further shrinkage in value and volume."

Improvements Made

The various improvements and extensions referred to in the semi-annual report of June 30, 1913, as in process of construction, have all been completed and successfully operated, except the by-product coke works, which plant, however, will be completed and placed in operation on or about April 1, 1914. In general, it may be stated that the program of increased capacity and general reconstruction incident to the change in the company's business from that of manufacturing principally iron to that of the exclusive manufacture of steel, as authorized in 1906, involved substantially the entire replacement of the rolling mill equipment of the company, as well as an increase of 150 per cent in steel capacity, also the general rehabilitation of the blast furnaces and the iron and coal mining properties; therefore, hereafter improvements will be confined entirely to new capacity and extension of facilities to manufacture the more highly finished products and to improvements suggesting economic refinement in production.

In view of the extraordinary character of the replacements incident to the reconstruction period referred to, the executive committee decided that it would be proper to appropriate from surplus $1,500,000 to apply on account of extraordinary depreciation and extinguishment, in addition to which there has been written out of profits covering depreciation for the year ending Dec. 31, 1913, the sum of $600,887.61.

In explanation of the changes to working capital, attention is directed to expenditures from this fund on account of improvements during the past year, to the aggregate amount of $1,844,222.65, and to an appropriation of $1,500,000 from working capital, for the retirement of a like amount of collateral notes, with a consequent reduction in the funded indebtedness of the company of $1,500,000, and after allowing for other minor changes there remains as a balance to net working assets as of Dec. 31, 1913, the sum of $11,155,484.25.

The company's pig iron production during the year 1913 was 895,949 gross tons, compared with 1,035,593 in 1912 and 921,779 in 1911. The theoretical blast furnace capacity totals 1,195,000 gross tons, of which 880,000 tons are in the northern district and 315,000 are in the southern district. Production of the Bessemer steel works in 1913 was 611,833 gross tons of ignots, compared with 682,285 in 1912 and 627,250 in 1911. Production of open-hearth steel works was 347,488 gross tons in ingots, compared with 354,008 in 1912. Bessemer and open-hearth production of billets totaled 959,321 gross tons, in 1913, compared with 1,036,293 in 1912. The output of finished and semi-finished products was 955,478 tons in 1913, compared with 1,039,517 tons in 1912, and 817,848 tons in 1911. The grand total of men employed in the northern and southern districts was 12,633. The total amount of wages paid was $9,999,263.24, an average of $792 to each man, compared with $9,119,457, an average of $741 in 1912.

To Sell More Stock

The Youngstown Sheet & Tube Co., Youngstown, O., has authorized the sale of an additional $3,080,700 of common stock. Sale of this block will make the outstanding common stock in excess of $18,500,000. Large plant extensions, particularly in the pipe department, are said to be proposed for the near future, so that the company's finishing mills can keep pace with its production of raw material. The Youngstown Sheet & Tube Co. was organized late in 1900 with a capital stock of $400,000; before the construction of its plant this stock was increased to $600,000. Within a few years this had increased to $6,000,000 and in 1909 was made $10,000,000, with the declaration of a stock dividend, and the sale of an additional $1,000,000 of stock. Later the capitalization of $20,000,000 was authorized. The new issue will be taken up by stockholders at its par value of $100 a share.

Mining Institute Proceedings

The proceedings of the eighteenth annual meeting of the Lake Superior Mining Institute, held on the Mesabi range, Aug. 22-30, 1913, have just been published and fill the largest volume ever issued by the organization. It embraces 245 pages with two supplements of 30 and 63 pages respectively. All of the important papers which are included in the proceedings were published in THE IRON TRADE REVIEW in August and September, 1913.

NEW BUSINESS

In New York, a somewhat better volume of inquiries continues to be reported by machinery dealers. The main business now before the trade is comprised of the railroad lists recently issued. These include the Union Pacific, Grand Trunk and Seaboard Air Line requirements. Another list that has come out is that of the Lehigh Coal & Navigation Co. This includes 12 small tools. The General Electric Co. has placed some small orders during the week, but the policy of that concern still is to curtail its purchases as much as possible. There has been a cessation in demand for cranes. Demand for machinery for shipment abroad continues fairly good.

In Pittsburgh, machine tool dealers have experienced some new demand, but actual business is not much better than it has been the last couple of months. Consumers are buying cautiously, and are extremely conservative about estimating requirements. Several transactions, which were first opened last fall, have been closed this week. Manufacturers of heavy rolling mill machinery are operating on contracts taken some time ago, although a number of attractive inquiries are pending.

In Chicago, the first half of February developed some very satisfactory business for machinery manufacturers and dealers. Many of the smaller shops are buying tools and some of the larger plants are figuring on more extensive lists. The railroads are buying more freely. The new shops of the Chicago & Western Indiana, at Clearing, near Chicago, will require about 40 tools.

In Cincinnati, a more optimistic feeling is evident in the metal trade, but buying and selling have shown no marked improvement since the first of the year. The general tendency is towards better business. Domestic inquiries are being received with more frequency, the call being mostly for single tools. The railroads do not show any inclination to close for several large inquiries which have been in the hands of machine tool makers for several months. Second-hand machinery is holding its own, but business in this line is not up to expectations. Special machinery, such as mixing and laundry machinery, is the best in demand. Small electrical equipment is reported to be selling in good lots. There is a surplus of labor, as most shops are running below their total capacities.

NORTHEASTERN STATES

BOSTON.—The Mead-Morrison Mfg. Co. will enlarge its East Boston plant.

FITCHBURG, MASS.—Manning, Maxwell & Moore, Inc., New York, plan to erect additions to the Putnam Machine plant.

LOWELL, MASS.—Lowell Bleachery Co. will build a modern boiler house and install a 1,000 horsepower boiler.

SPRINGFIELD, MASS. — The city will build a steel truss bridge with concrete covered beams over the Boston and Maine railroad tracks.

BRIDGEPORT, CONN.—The G. Drouve Co., manufacturer of patent skylights, will erect an addition to its plant.

BALDWIN, N. Y.—F. Westpfal Co. has been incorporated; cutlery, machinery, tools; $40,000; by M. M. Levy, Geo. Graff, Jr., Fred Westpfal, Harrison avenue.

HORNELL, N. Y.—The James Elgar Co. may enlarge its plant.

PATCHOGUE, N. Y.—June Mfg. Co. has been incorporated; to manufacture non-slipping horse shoe appliances; $15,000; by Henry W. Paine, Reuben J. Krause, Patchogue; Adolph Hoffman, Medford, Conn.

DONORA, PA.—Auto Cable Clamp Co. has been incorporated; $10,000; by Max Watchell, Nathan Watchell, Joseph Watchell, Donora.

MERCER, PA.—Preferred stock worth $30,000 has been subscribed by local business men in order to erect a planished iron works here.

MERCER, PA.—The Gailey Wrench Co. has leased the idle plant of the McCain Construction Co. and is putting it into shape to resume operations.

MYERSTOWN, PA.—Myerstown Foundry & Mfg. Co. has been incorporated; $10,000 by Leighton F. Krum, Lebanon; E. S. Karsnitz, F. K. Lutz, Myerstown.

BAYONNE, N.J.—The Coona Co. has been incorporated; chemical products; 10,000; by F. J. Besse, Milford, Conn.; R. L. Stephens, Louisa Koons, Bayonne.

CAMDEN, N.J.—The Brown & Robb Co. has been incorporated to manufacture automobiles; $100,000; by E. L. Brown, T. H. Robb, Herman Johnson, Gloucester City.

PATERSON, N. J.—The De Joing Iron Works has been incorporated; mechanical engineering; $25,000; by Charles De Joing, Frank E. Stillman, Minerd De Joing, Paterson.

WILMINGTON, DEL.—The Roth Elevator Safety Device Co. have been incorporated; $600,000; by Oscar J. Reichard, Wilmington.

WILMINGTON, DEL.—The Climax Machine Co. has been incorporated; $11,000; by W. M. Lupton, Wilmington.

ANNAPOLIS, MD.—Provision has been made for an additional $225,000 loan for a power plant, service tunnels, sewage system, roads and walks at the State Normal School.

HYATTSVILLE, MD.—A $10,000 electric light plant will be installed; address city clerk.

CENTRAL STATES

ASHLAND, O.—The U. S. Standard Mfg. Co. has been incorporated with a capital stock of $10,000, to manufacture concrete and slate machinery. Among the incorporators are Mark E. Marks, C. R. Marks and C. H. Snyder.

BELLFONTAINE, O.—The council will receive bids for $36,000 worth of improvements to the electric light plant, including internal combustion engines, turbine or reciprocating engines and improved cooling apparatus. Bidders must submit complete plans for the entire plant, to be installed, tested and turned over to the city.

BOWLING GREEN, O. — Bowling Green State Normal School will let contract soon for a $100,000 science hall building.

COLUMBUS, O.—The C. R. Bruer Smelting and Refining Co. has been incorporated; $50,000; by C. R. Bruer, Frederick Eggers, Joseph Pfeister, C. O. Brysen, C. J. McDiarmid. It succeeds the Cincinnati Metal Refining Co.

COLUMBUS, O. — E. F. Sayre, county auditor, will open bids March 5 for superstructure of Big Walnut creek bridge, Hamilton township; for the approaches to a bridge east of Shadeville; superstructure of bridge No. 2, Pleasant township; and for the approaches to Wilson bridge, Sharon township; Blendon bridge, Blendon township; Platter bridge, Hamilton township; Park Mills bridge, Mifflin township; Williams reinforced concrete arch bridge over Scioto river in Franklin and Norwich townships. Certified checks are required. Apply to county surveyor for plans.

COSHOCTON, O.—The local office of the Pennsylvania railroad has plans ready for elevating the tracks in this city; estimated cost, $200,000. The depot will be remodeled.

GREENFIELD, O.—A new high school building, to cost $250,000, will be erected. It will be of brick and concrete construction and will have a normal capacity of accommodating 500 pupils. The building will be a gift of E. L. McClain, formerly of Greenfield, who now owns a chain of cotton mills in the south.

LIMA, O. — The council is having plans drawn for the Pine street bridge.

McARTHUR, O.—The McArthur Brick Co. will erect a power house and install two boilers and a 300-horsepower engine and generator.

MARIETTA, O.—The American Iron & Supply Co. is endeavoring to purchase the building of the Marietta Transfer Co.

MARIETTA, O.—W. B. Alexander, Washington county auditor, will open bids March 5 for South Twin bridge across the east fork of the little Hocking river. A certified check for five per cent of the bid is required.

NILES, O.—The Ohio Galvanizing & Mfg. Co. is having plans drawn for a building.

PORTSMOUTH, O. — Portsmouth Street Railway Co. has applied for permission to issue $500,000 bonds for a street car line from Sciotoville to Ironton.

SHELBY, O.—The Auto Call Co. plans to improve its plant.

SIDNEY, O.—Geo. P. Stanley, county auditor, will open bids Feb. 28 for superstructure for a 52-foot steel highway bridge over Leatherwood Creek in Greene township.

TOLEDO, O.—Northwestern Ohio Natural Gas Co. will erect a $25,000 3-story, steel, brick and wood, shop and office building; modern machinery to be installed in the shop. A. Bentley & Son have the general contract.

URBANA, O.—The Urbana Light Co. plans to extend its lines 12 miles to the Big Four gravel pit between Cuyahoga Station and Mechanicsburg to furnish power to the 250-horsepower motors there and light to the residents along the line. A contract for a turbine engine is to be let.

WARREN, O.—The Trumbull Steel Co. has increased its capital from $1,250,000 to $2,500,000.

YOUNGSTOWN, O.—Bids will be received until February 20 by Frank V. Vegan, clerk, for furnishing material and constructing steel or reinforced concrete bridge on McCartney

road over Lincoln Park; estimated cost, $30,000

YOUNGSTOWN, O.—New Mahoning Light Co., Erie, Pa., has been franchised and is drawing plans for a power station to be erected here.

HUNTINGTON, W. VA.—The Chesapeake & Ohio railway plans to enlarge its shops soon; M. C. Caples, vice president.

WHEELING, W. VA.—The Wheeling Metal & Mfg. Co. is considering the increasing of its capital stock from $300.000 to $1,000,000 in order to double its capacity.

WHEELING, W. VA.—Ohio county commissioners granted the Brooke Electric Co. Warwood, W. Va., a 30-year franchise to build transmission lines over four county roads to furnish power for lamps and motors; E. G. Buffington, Wheeling, W. Va., contracting agent.

CENTRAL CITY, KY.—The council has granted the Central City, Greenville & Drakesboro Railway Co. a franchise; actual construction to begin within 60 days.

LOUISVILLE, KY.—The Louisville Machine Co. will increase its capital stock from $10,000 to $25,000 in order to take care of increasing trade.

PEMBROKE, KY.—R. H. Power Co., successor to the Pembroke Light, Power and Water Co., will buy material for a 27-mile transmission line, including transformers, transmission towers, lightning, arresters, insulators, underground conduits, distribution cables, tub transformers, rectifiers, arc and incandescent lamps, etc.; S. J. Ragsdale, general manager.

PINEVILLE, KY.—C. H. Johnson, Jellico, Tenn., may erect a stove foundry.

ANDERSON, IND.—It is rumored that Thomas Wright, owner of the Wright Steel Fence Post plant, is negotiating with the Shirmer Wire Fence Co. for an adjoining triangualr piece of land with 450-foot frontage on Ohio avenue and extending to the Big Four railroad on the south. It would be used as a storage yard.

EVANSVILLE, IND.—Pioneer Pole & Shaft Co. has let the contract for its factory to Chris Kanzler & Son.

GARY, IND.—A. B. Harris Electrical Co. has been incorporated; electrical fixtures; $20,000; by Arthur B. Harris, Cecilia R. Harris, W. B. Brookhouse.

INDIANAPOLIS, IND.—National Heating & Ventilating Co. has been incorporated; heating and ventilating; $5,000; by Van B. Cones, John A. White, Ethel K. Swift.

CHICAGO.—Holmes, Pyott & Co. have been incorporated to conduct an iron foundry; $200,000 by C. W. Holmes, D. A. Pyott, 159 North Jefferson street.

CHICAGO.—The Scarborough Co. has been incorporated to manufacture machinery; $100,000; by C. A. McKeand, S. A. Kenny, A. T. McGovern, 3900 South Union avenue.

CHICAGO.—The Kerr Auxiliary Co. has been incorporated; $100,000; to manufacture and sell engines, boilers, machinery, etc.; by C. V. Kerr, J. R. Deane, C. W. Greenfield, 175 W. Jackson Boulevard.

CHICAGO.—The Excelsior Motor & Mfg. Supply Co. is having plans drawn by John Alschuler, Sons & Co. for a six-story factory building, 100 x 574 feet, to cost about $450,000.

CHICAGO.—The Maginn Co. has been incorporated to build heating and ventilating machinery; $75,000; by Madison Maginn, Alfred Wegenfur, Charles C. Spencer, 179 West Washington street.

CHICAGO.—Maher & Byrne Co. has been incorporated to manufacture mechanical and engineering devices; $10,000; by Louis J. Byrne, Eugene E. Maher, Lincoln E. Maher, 354 West 65th street.

CHICAGO.—Leopold Cohen Iron Co. has been incorporated to conduct a business in buying and selling iron and steel; $10,000; by John D. Clancy, George B. Cohen, Leopold Cohen, West 31st street and South Homan avenue.

CHICAGO.—Lead Mold Electrotype Co. has been incorporated to manufacture and deal in electrotypes, stereotypes and engravings; $5,000; by Abraham W. Francis, Edward J. Stevens, James McKeag, 38 South Dearborn street.

ELGIN, ILL.—Elgin Sheet Metal Products Co. has been incorporated to manufacture products of sheet metal; $5,000; by Conrad Ekvall, Charles Nelson, E. O. Ekvall.

LAGRANGE, ILL.—LaGrange Talking Machine Co. has been incorporated to manufacture and deal in talking machines; $25,000; by I. Carl Davidson, 30 North La Salle street, Chicago, Meyer Morton, Herbert Luttman.

MOLINE, ILL.—An artificial ice manufacturing company has been incorporated; $100,000; by L. A. Fritz et al.; plant to be built as soon as plans can be drawn.

ROCK FALLS, ILL.—This town voted $8,000 for improving and extending the municipal electric light system; O. M. Aarvig, superintendent.

BATTLE CREEK, MICH.—United Steel & Wire Co. has increased its capital stock from $25,000 to $60,000.

COLDWATER, MICH.—The board of public works will receive bids for a 300-horsepower boiler, water tube type, to cost about $5,000.

DETROIT.—The Detroit United Ry. Co. has plans for a group of steel and brick buildings for its shop department, to be erected on its Highland Park property.

LANSING, MICH.—Lansing Stamping & Tool Co. has been incorporated; $40,000.

MARSHALL, MICH.—The New Process Steel Co. plant has been sold to the Simons-Leedle Furnace Co.

DODGEVILLE, WIS.—The Dodgeville Electric Light & Power Co. is having plans prepared for new equipment.

EAU CLAIRE, WIS.—The Schwan-Seybroth Mfg. Co., incorporated; $25,000; Leonard Seybroth, W. Scham and W. B. Seybroth; to engage in the manufacture of specialities.

MILWAUKEE.—The city is preparing a bond issue of $150,000 to construct a bascule bridge to replace the old bridge over Milwaukee river between State and Martin streets. L. J. Klug is superintendent of bridges, department of public works. Work will begin about April 15.

RACINE, WIS.—The Mitchell Wagon Co. incorporated; $500,000; to manufacture wagons and wood and metal automobile bodies; Milton J. Knoblauch, George N. Pratt, Ray H. Weins, John B. Rowlands and John B. Simmons.

KANSAS CITY, MO.—The National Mailing Machine Co. has been incorporated; $500,000; by F. R. S. Ditmars, H. A. Stevens, W. Beck.

ST. LOUIS.—The Banner Iron Works has bought a 100 x 162-foot lot opposite its plant.

ST. LOUIS.—Continental Brass & Foundry Co. has been incorporated to deal in brass and other metals; $2,500; by G. D. Klemine, Belleville, Ill.; Joseph Messmer, Kirkwood, Mo.; Lewis F. Ostrender, St. Louis.

MINNEAPOLIS, MINN.—Architects Long, Lamereaux & Long are drawing plans for a 14-story hotel with electric light plant.

SOUTHERN STATES

WILKESBORO, N. C.—Town commissioners may install engine and boiler as auxiliary to water-power for municipal electric lighting plant.

CHARLESTON, S. C. — Commandant of the navy yard will install machine tools in boiler shop and foundry, building No. 9, including two 20-ton overhead cranes; estimated cost, $30,000; with installation cost, $40,000; also additional machinery in forge shop, building No. 6.

BIRMINGHAM, ALA.—The Caldwell-Watson Foundry & Machine Co. will rebuild the boiler and blacksmith shops damaged by fire.

NATCHITOCHES, LA.—City may buy a 50-kilowatt generating unit, consisting of generator and engine, 3-phase, 60-cycle, 2,300-volts, and switchboard and material for one mile of residential lighting; also 10-horsepower pumping plant for the normal school.

FORT WORTH, TEX.—City's plans for Nine Mile Bridge across Trinity river include 1300-foot concrete and steel structure; contract price, $16,000.

HOUSTON, TEX.—The Texas Co. will erect a large building, probably 10-story, at San Jacinto and Rusk, directly facing Federal square.

PLEASANTON, TEX.—The Pleasanton Ice and Light Co. will enlarge its light and power plant.

VICTORIA, TEX.—Victoria Safe & Lock Co. will increase its capital stock from $40,000 to $100,000.

CHATTANOOGA.—Tennessee Valley Light and Power Co. has been incorporated; $1,100,000; by Farrand S. Stranahan, W. Emery Wardwell, and Roy N. Grout, Worcester, Mass.; offices at Worcester and Chattanooga.

DRESDEN, TENN.—City issued $27,000 light and water bonds; R. L. Suddath, mayor.

JACKSON, TENN.—This village will issue $25,000 electric light bonds.

OKLAHOMA CITY, OKLA.—Beardman Co., manufacturer of metal silos, tanks, smokestacks; also builder of bridges, contractor's and road machinery, has increased its capital stock to $125,000. John R. Beardman, secretary.

WESTERN STATES

DECATUR, NEB.—Electric light bonds have been voted, plans drawn, and contracts will soon be let.

LEAVENWORTH, KAN.—W. F. Hunter has purchased the property of the Western Hinge & Mfg. Co. at bankruptcy sale. He was former manager.

GLENDIVE, MONT.—Glendive Heat, Light & Power Co. build a plant including one 500-kilowatt steam turbine, one 300-kilowatt steam turbine, boilers, switchboard, smokestack, coal conveyor, etc. Frank C. Hughes, manager.

KELLOGG, IDAHO.—Long Valley Light & Power Co. plans to erect about 10 miles of 6600-volt transmission line and purchase one 300-kilovolt-ampere generator, a 500-horsepower waterwheel and four 25-kilovolt-ampere transformers.

LEWISTON, IDA.—Nez Perce and Latah county commissioners will order three steel bridges at Juliette and Kendrick, one 158-foot span and two 85-foot spans; final decision in April.

CHEHALIS, WASH.—The Pacific Coast Pipe Co. is considering the removal of its plant here from Seattle.

NORTH YAKIMA, WASH. — North Yakima Valley Transportation Co. has surveyed for its 10-mile Wide Hollow electric line to the Yakima reclamation project unit.

OKMA, WASH.—Federal authorities have set aside sufficient funds and ordered power stations and a large pumping plant to be installed just north of this place on the Okanogan river; Calvin Casteel, project manager.

SEATTLE, WASH.—Council wil spend $25,000 to repair the tracks and build a 500-kilowatt generator sub-station for the nine-mile municipal street car system.

VANCOUVER, WASH.—The Pacific Power & Light Co. has filed a $30,000,000 mortgage; extensive improvements may follow.

PORTLAND, ORE.—O. O. Keppel is having plans drawn for a $75,000 natatorium.

ROSEBURG, ORE.—County engineer is drawing plans for a steel bridge across Umpqua river at Kellogg; approximate cost, $35,000.

SPRINGFIELD, ORE.—The Oregon Power Co. will ask bids soon for conveying machinery for the fuel storage plant.

BANNING, CAL.—The Coachella Ice & Electric Co. and the Holton Power Co. plan to spend jointly $281,655 to carry power to and distribute it in El Centre.

TRADE NOTES

BILLERICA, MASS.—The locomotive department of the Boston & Maine railroad's large new shops at Billerica, Mass., was put in operation on Feb. 9, and the remainder of the plant is rapidly being brought to completion. It is expected that the car department will be placed in operation in a few weeks. When the entire plant is running on full working schedule, which is expected to be in effect in a few months, it is announced that more than 2,000 men will be employed.

CINCINNATI.—Estimates on the refrigerator equipment to be used in the new three-story plant of the French Bros. Baurer Co., will be received within a short time. The plans were prepared by the Tait-Nordemeyer Co., of St. Louis.

CINCINNATI.—The Cincinnati Metal Refining Co., Dayton street, will be succeeded by the C. R. Breuer Smelting & Refining Co., of that city, which has recently been incorporated with a capital stock of $50,000. C. R. Breuer, of Cincinnati, is president of the new company.

CINCINNATI.—The Ideal Machine & Tool Co. has increased its capital stock from $10,000 to $30,000, and will enlarge its manufacturing facilities and purchase some new machinery in order to take care of its increasing business. The company manufactures special machinery, dies and metal specialties, and at present is bidding on several special machines for the United States government. The officers of the company are: President, John Aspenleiter; secretary, M. B. Urlage; vice president and general manager, L. M. Bryan, and treasurer, Harry Leiser.

PAINTSVILLE, KY.—A merger of the Kentucky River Consolidated Coal Co., the Haly Coal Co., the Letcher Coal & Coke Co., the Henry Coal & Coke Co. and the Slemp Coal Co. into the Slemp Consolidated Coal Co. was effected at Paintsville on Feb. 11. The new company has a capital stock of $2,500,000, and controls 100,000 acres of coal and coke lands in Letcher, Perry, Leslie, Knott and Breathitt counties, Ky. The officers elected are as follows: President, C. B. Slemp, of Big Stone Gap, Va.; vice president, Col. John C. C. Mayo, of Paintsville, Ky.; secretary,

George F. Copland, of Lexington, Ky., and treasurer, John E. Buckingham, of Paintsville, Ky. The directors are: C. B. Slemp, John C. C. Mayo, D. A. Langhorne, R. W. Reed, T. J. Davis, Fred Faulkerson, J. R. Downing, John E. Buckingham and J. N. Camden.

SOUTH BEND, IND.—The Indianapolis Brass Foundry & Mfg. Co. has increased its capital stock from $10,000 to $15,000.

STRATFORD, CONN.—The Bullard Machine Tool Co., Bridgeport, Conn., has conveyed to the American Brass Co. a tract on the west side of the Housatonic river, in the town of Stratford, for a consideration said to be about $27,000. The American Brass Co. plans to establish on the property a large receiving and shipping station, including docks, coal sheds and storehouses. Negotiations already are under way for a side track to connect the property with the New Haven's main line. Coal and copper and other raw materials will be brought to this point by water and stored for shipment to Ansonia, Waterbury and Torrington, where the American Brass Co.'s plants are located.

WARREN, O.—The Warren Forge & Tool Co. has elected officers as follows: President, James Robertson; vice president and secretary, M. J. Konold; treasurer, George E. Warner; general manager, George F. Konold.

WATERBURY, CONN.—The Waterbury Tool Co. has increased its capital stock to $280,000.

WAUKESHA, WIS. — The J. B. Rowell Co., agricultural implements, is about to increase its capital stock from $100,000 to $200,000 to provide for general extensions of the business, including manufacturing facilities. Plans are under consideration.

WINTERS, TEX.—The Winters Light & Power Co. has increased its capital stock from $10,000 to $15,000.

WORCESTER, MASS.—The Mason Brush Works, manufacturer of mill and machine brushes, which occupies the third and fourth floors of the old Telegram building, that city, has leased additional space on the second floor and is installing additional machinery which practically will double its output. About 25 more operatives will be employed.

YOUNGSTOWN.—The Republic Iron & Steel Co. has placed a contract with the George T. Ladd Co., power plant engineer, Pittsburgh, for two 100-horsepower single valve, side crank Ames automatic engines to be direct connected to constant pressure fans for its by-product coke oven plant.

TRADE PUBLICATIONS

PRESSES.—The Watson-Stillman Co., New York, has issued a 56-page catalog describing its line of heating, chilling and die presses.

SAWING MACHINES.—The Newton Machine Tool Works, Philadelphia, has issued a pamphlet descriptive of its 4,000-pound cold metal sawing machine.

CRABS AND WINCHES. — The Brown Hoisting Machinery Co., Cleveland, has issued an illustrated pamphlet describing its safety crabs and winches.

PIPE.—The Standard Spiral Pipe Works, Chicago, has issued an illustrated 36-page catalog describing reinforced spiral pipe, forged steel flanges, valves and cast fittings.

TOOLS.—The Rich Tool Co., Chicago, manufacturer of drills, reamers, chucks, etc., has issued a 74-page catalog illustrating and describing its products.

BUCKETS.—The Hayward line of orange peel and clam shell buckets is illustrated and described in a recent publication of the Hayward Co., 50 Church street, New York.

PORTABLE MINE HOISTS.—In an 8-page bulletin issued by the Chicago Pneumatic Tool Co., Chicago, portable mine hoists are illustrated and described. The hoists also can be used as stationary machines, if desired.

CUTTING AND THREADING MACHINERY.—Pipe cutting and threading machinery for hand, belt or electric power, manufactured by the Curtis & Curtis Co., Bridgeport, Conn., is illustrated and described in a recent catalog.

PUMPING MACHINERY.—The Weinman Pump Mfg. Co., Columbus, O., has issued a bulletin describing its line of boiler feed pumps, pressure pumps, outside center packed plunger pumps and tank pumps.

CHAIN DRIVES.—The Morse Chain Co., Ithaca, N. Y., has issued a bulletin containing short descriptions of typical installations of the Morse silent chain drives, showing their durability and efficiency.

CRANES.—A 20-page bulletin issued by the Pawling & Harnischfeger Co., Milwaukee, is devoted to its new type "H" crane, which is described in detail and all of the various parts are well illustrated.

PULVERIZED COAL.—The Knox Pressed & Welded Steel Co., Pittsburgh, has issued three bulletins treating of the various uses of pulverized coal, with particular reference to its manufacture and use in connection with boilers and in malleable iron foundries. The advantages of this type of fuel are discussed.

SMALL MOTORS. — A 16-page bulletin, recently issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is devoted to small motors for operating small equipment. General views are included showing the Westinghouse company's department for assembling these machines and their construction is described in detail.

IMPACT BALL TESTER.—A circular issued by Wheelock, Lovejoy & Co., New York City, describes a device for determining the softness of steel. The piece to be tested is placed on a solid block of iron or concrete upon which a weight is dropped and the diameter of the indentation, determined by a celluloid scale, expresses the result. The device is exceedingly simple and should prove of value in every plant using steel.

MEN OF THE IRON TRADE

JOHN ORMEROD, of the Donaldson Iron Co., Emaus, Pa., is on a trip to Cuba.

W. F. HARRISON, for the past 16 years master mechanic for Worth Brothers Co., at Coatesville, Pa., has resigned.

JOHN D. HIBBARD, commissioner of the National Metal Trades Association, has gone to Florida for a stay of a month.

R. L. FOGLEMAN, of Terre Haute, Ind., has been appointed agent for the American Car & Foundry Co. of New Jersey.

CLYDE M. CARR, president of Joseph T. Ryerson & Co., Chicago, will spend the week of Feb. 23 to 28 in New York City.

R. L. MONTGOMERY and Thomas Newhall have been re-elected directors of the J. G. Brill Co., Philadelphia, car manufacturer.

W. H. BARR, president of the International Foundrymen's Asociation, will be in Cincinnati, O., on Feb. 24 to meet the foundrymen of that city.

G. I. ANDREWS, general manager of sales, American Sheet & Tin Plate Co., Pittsburgh, has returned from Florida, where he spent the last two months.

R. M. OTT, formerly chief clerk in the Pittsburgh warehouse of the Carnegie Steel Co., is now general manager of Lan & Hogan, Youngstown, O.

GEORGE R. PERKINS, superintendent of Tod furnace of the Brier Hill Steel Co., Youngstown, recently underwent a serious operation at a local hospital but is reported recovering.

A. W. TYLER has been appointed manager of the Zug Iron & Steel Co., following the resignation of A. M. Brown, secretary and operating manager. The position of secretary will be filled in the near future.

THOMAS MATCHETTE, manager of the belting department of the Republic Rubber Co., Youngstown, O., has been named vice president and general manager of the Robins Conveying Belt Co., New York City.

HARRY C. KRIDER, for the last 10 years identified with Max Soloman, iron and steel scrap dealer, Pittsburgh, has resigned to become associated with the Charles Driefus Co., engaged in similar business, Oliver building, Pittsburgh.

CHARLES M. SCHWAB was presented with a handsome loving cup at the formal opening recently of the new hall at South Bethlehem, Pa., for the brass band of the Bethlehem Steel Co. Mr. Schwab was the donor of this hall.

HOMER A. PARDES, who 13 years ago started out as a stenographer for the Crucible Steel Co. of America at Syracuse, N.Y., now at the age of 32, has become manager of the Spaulding & Jennings plant of the same company at Jersey City, N.J.

NEWTON A. WATSON, proprietor of the N. A. Watson Brass Works, and of the Erie Button Works, Erie, Pa., suffered a stroke of apoplexy, recently, following a three weeks' serious illness. Recovery is pronounced doubtful by attending physicians.

FLETCHER COLLINS, who has been associated with Banning, Cooper & Co., Ltd., Oliver building, Pittsburgh, has accepted a position as Pittsburgh representative of the Evans Coal & Coke Co., Connellsville, Pa., with offices in the Frick building, Pittsburgh.

LAWRENCE E. RIDDLE, superintendent of the Isabella furnaces of the Carnegie Steel Co., Pittsburgh, has been appointed successor to John P. Collins, deceased, as general superintendent of the city blast furnaces of the Carnegie company, including the Edith, Isabella, Neville and Lucy groups.

C. P. BURGESS, operating superintendent of the Republic Iron & Steel Co., Chicago district, has resigned and will become general manager of the St. Louis Screw Co., St. Louis, assuming his position about March 1. The St. Louis Screw Co. is about to build a rolling mill in connection with its bolt and screw works.

G. WATSON CREIGHTON has been appointed to the superintendency of the rail and blooming mill of the Pennsylvania Steel Co.'s plant at Steelton, Pa. John B. Downs, in charge of the mill for many years, has retired from active service. J. B. Martin, superintendent of the Bessemer mill for more than a quarter of a century, also has retired.

JOHN F. WALLACE has resigned as president of the Electric Properties Corporation to give all his time to the management of Westinghouse, Church, Kerr & Co., New York City, construction engineers. All the stock of the latter is owned by the Electric Properties Corporation. A. Ludlow Kramer has been made president of the Electric Properties Corporation.

WILLIAM H. HULICK, of New York, has been elected president and treasurer of the Warren Foundry & Machine Co., Phillipsburg, N. J., succeeding William Runkle, who recently died. Mr. Hulick has been vice president of the company. The other officers elected were A. D. Chidsey, of Easton, vice president and assistant treasurer, and S. A. Bristol, secretary. The directors elected were John S. Riegel and Mr. Hulick, of New York; Mr. Chidsey, E. J. Fox and S. H. Hackett, of Easton, Pa.; James Ingham and John Moore, of Phillipsburg.

The Rolling Mill Industry

By F. H. KINDL, Engineer

A Condensed, General Description of Iron and Steel Rolling Mills and Their Products.

Cloth, Illustrated - - - $2.00
Full Flexible Leather - - $3.00

In this work the author has endeavored to give a condensed, general description of iron and steel rolling mills and their products, without discussing the details of rolling any special material. Essentially, it is a summary of American rolling mill practice, its development being traced from the beginning to the present day.

An effort has been made to define more closely the various mills and their products and the various classifications herein presented have been approved by leading manufacturers and many of the country's foremost iron and steel engineers.

The charts which graphically show the production of semi-finished and finished products, from 2,000 pounds of iron ore, 1,000 pounds of coke and 600 pounds of limestone represent modern practice at some of the largest open-hearth plants and rolling mills. Charts also are included to clearly illustrate the amounts of material charged and produced in making one ton of pig iron; the distribution and production of iron and steel in 1907 and 1911; the conversion of pig iron into the various finished products, etc.

For those interested in the economics of the iron industry, a table has been prepared in which a comparison has been made of the general fundamental factors dictating the production of pig iron in the United States, Germany and Great Britain, with particular reference to the Pittsburgh district of the United States, the Rheinland-Westfalia district of Germany, and the Cleveland district of Great Britain.

The Iron Trade Review

PUBLISHER

Penton Bldg. CLEVELAND, OHIO

Making the Gray Iron Foundry Pay Dividends

(*Continued from page 365*)

Manganese is a better softener than silicon. The easiest way to add it to the mixture is in the shape of manganese steel scrap. Mixtures for automobile engine castings contain as high as 1 per cent manganese to keep the mixture soft and the silicon low, and also to prevent sponginess in the unequal sections of the castings.

Cupola Operation

An essential, yet neglected part of foundry management is the proper operation of the cupola.

In charging a cupola, keep the charges absolutely level throughout the heat and charge the coke and large pieces of iron around the edge, and the small pieces, that is, the scrap, in the center.

To keep the charges level, the kindling must be in short pieces, approximately 2 feet long. It must be arranged to insure a level bed, otherwise, when it burns out, it will tilt all the charges above.

Each succeeding charge should be leveled. The coke should be charged against the wall of the cupola so that the strong air blast from the tuyeres will strike it and thus produce hot iron.

Pig iron and heavy scrap should be arranged around the inside circumference of the cupola where they will be subjected to the highest temperature. The pigs should be charged against the wall in a neat ring, the end of one pig butting against the end of the next.

Light the fire after two-thirds of the bed coke is charged. After lighting, charge the other third.

Begin charging the cupola as soon as the bed coke is heated to redness.

Have the cupola fully charged 30 minutes before the blast goes on—not sooner and not later. In this way the full benefit is derived from the heat of the fuel.

Tap out when the blast is on 30 minutes.

Never let the tap hole blow, as it allows slag to run into the ladle, and slag will finally get into the castings. Always carry a large body of melted iron in the cupola. The tapped iron then will come from the bottom of the molten mass where it is absolutely clean.

Be sure the ladle is heated before the first tap. Make the tap hole ⅞ inch in diameter. The small tap hole makes it easy to handle the iron under pressure in the cupola.

Close the tap hole with molding sand before the blast goes on. This will preserve the bed coke and also will save some iron that is usually wasted.

Charging the Cupola

Make the first charge of iron double the weight of those that are to follow. The coke in the bed is sufficient to melt it. Reduce the coke charges, day after day, until cold iron begins to result; then increase them a little.

Use steel scrap on the first charge and pour the heavy castings with this iron. Steel is necessary in heavy castings to make them close-grained, with low silicon.

Charge the coke to a height of 24 inches above the top of the tuyeres.

One pound of coke in the bed should melt three pounds of iron.

Use the least amount of coke possible. Excessive coke produces slow melting, raises the sulphur in the castings and increases the material expense of operating the foundry.

Flux is not generally required. Limestone is better than fluorspar. Fluorspar makes the flux so thin that it

will flow with the iron and get into the mold. Use 30 pounds of limestone to 1,200 pounds of iron.

If these rules are followed, the iron will come out white hot.

Few realize the bad results of cold iron.

More castings are thrown out on account of having been poured with cold iron than from any other cause.

Results of Cold Iron

For a brief period in any mold, no matter how softly rammed, well-vented, or dried, there is a violent passage of gas from the sand into the iron. If the iron is cold and solidifies while this is still going on, the machined faces will be covered with little pit holes or smooth, bubble-like hollows.

Iron should be tapped white hot and must be hurried to the molds and poured quickly. Too much iron in the ladle will cause the last molds to be poured cold. Pour the left-over iron into pig beds and not back into the tapping ladle. Have the phosphorus in the mixture high enough to keep the iron fluid.

Keep in mind that hot iron feeds the casting better than cold iron and prevents sponginess.

Pertinent Pointers

Hot iron makes the casting solid under risers.

Hot iron makes clean castings.

Hot iron makes soft castings and castings free from blow-holes.

Hot iron reduces sulphur.

Dry bottom sand gives clean, hot iron.

Two-foot pieces of wood or shorter give hot iron.

Dry wood leveled gives hot iron.

Use large coke in bed. A level bed gives hot iron.

Use small pieces of iron. If pigs are broken, especially for the first charge, it will make hotter iron and will reduce the coke.

Scrap in the center gives hot iron.

Scrap not too large gives hot iron.

Mineral Output of Colorado in 1913

The output of Colorado mines for eleven months of 1913 with an estimate for December, according to preliminary figures by Charles W. Henderson, of the United States geological survey, shows a production of $18,395,000 in gold, 9,150,000 ounces of silver, 85,500,000 pounds of lead, 7,634,000 pounds of copper, and 129,680,000 pounds of zinc (in terms of spelter and zinc in zinc oxide), with a total value of $36,200,000, compared with $37,320,996 in 1912. This shows a decrease of $200,000 in gold, an increase of 900,000 ounces of silver, an increase of 10,300,000 pounds of lead, an increase of 500,000 pounds of copper, and a decrease of 2,540,000 pounds of zinc. The heaviest decrease in value was $1,732,000 for zinc, and there were increases of $440,000 for silver and $377,000 for lead.

The output of Cripple Creek showed an increase of $176,000 in gold. The Roosevelt tunnel continued to lower the water level gradually. In the Vindicator and Golden Cycle mines electric pumps were installed. Lower levels were opened during the year.

The Golden Cycle and Portland cyanidation mills at Colorado Springs were operated steadily, with an increased output. Cyanide mills in the district also made an increased yield. The Standard chlorination and cyanidation plant at Colorado City was idle, but the Union cyanidation plant at Florence was operated part of the year on old tailings. The tonnage of smelting ore from Cripple Creek decreased slightly.

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